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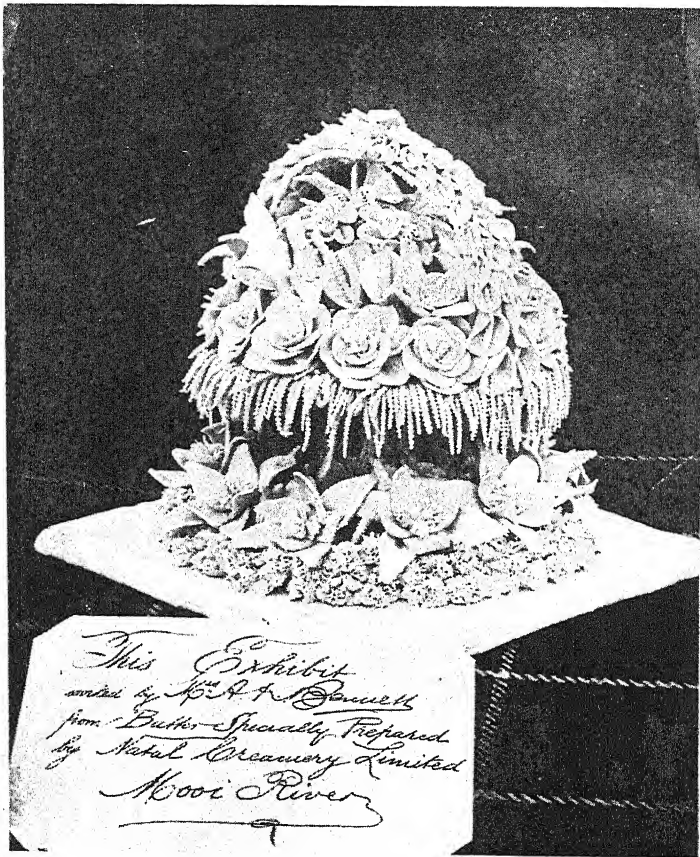
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A NOVEL BUTTER EXHIBIT.

Worked by Mrs. A. K. Bennett, from Butter specially prepared by the
Natal Creamery, Ltd.

Natal Agricultural Journal and Mining Record.

Paddock Feeding of Pigs.

By E. R. SAWER, Director, Experiment Stations.

THREE periods of growth may be distinguished in the life-history of the bacon hog, namely, from birth to weaning, a period of frame and muscle development, and, lastly, the time occupied in a process of fattening and finishing. During the second period plenty of exercise and abundance of green forage and roots are essential. The pig is by nature a grazing animal. It is impossible to turn a profit upon sty-raised hogs fed largely upon maize at its present value. A constant maize ration is injurious to health, is too fattening, makes greasy pork, and does not supply sufficient material for the growth of frame, lean meat and muscle. Paddocks of bean, rape, lucerne, sweet potatoes, monkey nuts, pumpkins, buckwheat and paspalum are essential, and with a small daily ration of maize, oats, barley or mealie bran, in as great a variety as possible, will furnish pork at the lowest possible price and of the best obtainable quality. It has been repeatedly shown that, while it takes from $4\frac{1}{2}$ to 6 lbs. grain sty-fed to make 1 lb. pork, the same gain can be made from 1 to 2 lb. grain, and as much green forage and roots as the hog will eat. Pigs kept in paddocks are less trouble, thrive better, and fatten more rapidly than sty-fed animals.

In demonstration of these facts a series of feeding experiments have been organised at the Winkel Spruit Experiment Farm. Acre paddocks have been fenced and planted with ground nuts, sweet potatoes, beans and arrowroot respectively, and the results from the first two mentioned crops are now to hand. Twelve hogs of the average weight of 43 lbs. were selected for the experiment, and paddocked on the 18th May. At the end of the first week a total gain of 80 lbs. in live weight was shown, or, approximately, 1 lb. per diem in individual animals, due

entirely to the ground nut forage, no additional ration being fed. The second week's feeding resulted in a further total gain of 66 lbs. in live weight, equal to an average individual gain of $5\frac{1}{2}$ lbs. During the third week an additional daily ration of 1 lb. mealie meal and 1 lb. of potatoes per hog was supplied. The total gain, however, was less than in the preceding week, namely, 63 lbs., a result which would appear to clearly indicate exhaustion of the forage. The hogs were accordingly removed to the adjoining paddocks containing a heavy crop of sweet potatoes.

PIG FEEDING IN Paddock OF GROUND NUTS.

Number of Hogs.	Date of Weighing.	Weight. lbs.	Gain. lbs.
12	18/5/07	515	...
12	25/5/07	595	80
12	1/6/07	661	66
12	8/6/07	724	63*

Total Gain in 21 days 209 lbs.

* Also fed daily ration of 1lb. mealie meal and 1lb potatoes.

With a view to determining whether this rapid and healthy growth could be further accelerated by the addition of a small grain ration, the pigs while running in the sweet-potato paddock were fed daily one pound of mealie meal, and the following encouraging results secured:—

PIG FEEDING IN Paddock OF SWEET POTATOES.

Number of Hogs.	Date of Weighing.	Weight. lbs.	Gain. lbs.
12	8/6/07	724	...
12	15/6/07	778	54
12	22/6/07	927	149

Total Gain in 14 days 203*

* Also fed daily ration of 1 lb. of mealie meal.

INDIVIDUAL GAINS OF HOGS.

Number,	18/5/07 lbs.	22/6/07 lbs.	Number,	18/5/07 lbs.	22/6/07 lbs.
1	52	86	7	38	73
2	52	84	8	46	82
3	30	61	9	43	75
4	54	102	10	33	63
5	41	62	11	36	65
6	44	83	12	46	92

Average individual gain in 5 weeks, $34\frac{1}{2}$ lbs.

It will thus be seen that, as stated above, a uniform increase in live weight can be maintained at the rate of 1 lb. per diem, at the cost of 1 lb. of mealie meal, and as much green forage as the hog will eat. An acre of well-grown ground nut has been found capable of carrying 30 pigs for a period of 3 weeks, and a similar area of sweet potatoes the same number of pigs for 10 weeks.

(To be continued.)

Notes and Comments.

CAPE MEALIES IN LONDON.—In the course of a recent report, appearing in the *Cape Times*, on Cape products on the London market, Mr. Chiappini says, with reference to maize: "Messrs Campbell & Phillips state that the Cape maize, that is, the yellow, hard, small mealies, is 9d. to 1s. per 480 lbs. above the best market price of maize from any other country."

CAPE SECRETARY FOR AGRICULTURE.—In the *Cape Government Gazette* of the 11th June announcement is made of the resignation of the Hon. Arthur J. Fuller, M.L.A., Secretary for Agriculture. In his place has been appointed the Hon. Colonel Charles Preston Crewe, C.B., M.L.A., who has resigned from the office of Colonial Secretary. Mr. Fuller has been appointed a Minister without portfolio. The Hon. Sir Pieter Hendrick Faure, K.C.M.G., M.L.A., takes Colonel Crewe's place as Colonial Secretary.

CO-OPERATIVE BUTCHERIES.—Of interest as showing the development of the progressive spirit among our farmers is the resolution carried unanimously at a meeting of the Dronkylve Farmers' Association held last month regarding the establishment of co-operative butcheries. On the motion of Mr. A. C. Camp, it was resolved "that this association approach other farmers' associations of the Colony, with a view to establishing co-operative butcheries in the towns, in order to make farmers independent of existing butchers' rings." According to the report of the proceedings furnished to his paper by the *Natal Witness* correspondent at Creighton, Mr. Camp said that it was plain that farmers were at the mercy of the butchers, and if they hoped to sell their slaughter cattle at a fair price before they all died of tick fever, which was quite possible, they would have to join together and establish co-operative butcheries in the towns, and sell at a fair price to themselves and the consumers, and there was no reason why they should not do it now, as the Government had given them every facility to do so by establishing the abattoirs and cold storages in the towns. The resolution passed by the association is certainly a step in the right direction; but it will be remembered that a similar project brought forward by the Natal Agricultural Union a few years ago fell to the ground owing to lack of support from the farming community.

O.R.C. "WOOL MEETINGS."—The Department of Agriculture of the Orange River Colony is holding, during the months of July, August and September, a series of meetings of wool-growers in various parts of the Colony, for the discussion of matters in connection with wool production and export. Mr. McNab, the Government Wool Expert, will give practical advice to farmers; and Mr. C. von Maltitz will open a discussion on the scab insect, its life history and habits, illustrated by diagrams. In all 49 meetings are advertised to take place.

AGRICULTURE IN ESHOWE DISTRICT.—The farmers around Eshowe are making an appreciable difference in the appearance of the country that a year ago was green veld, writes a correspondent. A good deal of ground has been ploughed over, and little places put up as residences upon the farm. Unfortunately, East Coast Fever has kept many from doing as much as they would otherwise have done had there been no restriction upon the movement of cattle. These restrictions have undoubtedly, our correspondent says, kept the district clean. "It is peculiar," he adds, "but many people assert that there has been no case of East Coast Fever here, because it did not become virulent and sweep half the country-side. They won't give credit to the precautions used." There have been several suggestions of co-operation by farmers, but so far nothing material has been done. Co-operation will be necessary, our correspondent says, to handle and store the good crop of mealies which is expected if the locusts are grappled with in the voetganger stage.

PAPER BOTTLES FOR MILK.—The *Scientific American* refers to the introduction of paper bottles for the retail supply of milk. As is pointed out, to wash milk bottles clean is difficult—often very difficult—and cannot be done except in boiling water. Men cannot, however, work in boiling water, and so lukewarm or tap water is used. "Evidently the glass bottle is a misfit, and wrong." The solution of the difficulty, it is said, is the abandonment of the glass bottle and the substitution thereof of the single-service paper package for milk. A paper bottle that is about to be placed on the market is in the form of a plain paper cylinder, with top and bottom. This "bottle" is made of spruce-wood paper; and, though it weighs less than an ounce, it is quite strong and will, it is stated, support a vertical crushing strain of more than a hundred pounds when filled. A paraffin coating renders the paper impervious to moisture, so that the package may stand for weeks or even months without losing any of its liquid contents. The milk is not in any way affected, it is stated, either by the bottle itself or the paraffin.

GROUND NUTS AND CASTOR OIL BEANS.—A ready market is now being created in Natal for ground nuts and castor oil beans, by reason of the demand for these products for oil-making purposes. The Durban Oil and Soap Co., Ltd., have addressed a communication to the Department of Agriculture asking whether ground nuts and castor oil beans are obtainable in this Colony in sufficient quantities for oil-making purposes. They state that they would require at least from 200 to 300 tons annually. Farmers interested should place themselves in communication with the Oil and Soap Co., Ltd., as it may be found feasible to greatly extend the acreages at present under these crops, and thus provide a fresh source of revenue for the farm.

MOVEMENT OF CATTLE IN INANDA DIVISION.—The Minister of Agriculture has given permission for the movement of cattle within a certain portion of the Magisterial Division of Inanda upon written authority being first obtained from the local District Veterinary Surgeon, Stock Inspector, or a member of the District East Coast Fever Committee, and subject to any directions or limitations which may be imposed in the permission given. In all cases the route by which the cattle may travel is to be described in the permit given. The following is the portion of the Division referred to:—From a point about midway between the Umhloti and Tongaat Rivers on the sea shore, thence along the Northern boundaries of Lots 7, 8, and 8a of the Cotton Lands, thence along the Southern borders of the farms Klipfontein, Lot 2 of the farm Buffels Kloof and Frosterly, and from the South-western beacon of the farm Roodekranz (Redcliff), on the Ndwedwe Location boundary, thence along the Ndwedwe Location border to the Umgeni River, and down the Umgeni River to the sea.

FOOD-VALUE OF FRUIT.—In an article on the food value of tropical fruits in the *Hawaiian Forester and Agriculturist*, Dr. E. C. Shorey shows that, in addition to being agreeable accompaniments to staple foods, analysis reveals the fact that fruits have some food value of their own. They contain, that is to say, more or less digestive proteids, carbohydrates, or fats. But fresh fruits consist usually in great part of water, which forms nearly 90 per cent. of oranges and pineapples, and more than 75 per cent. of many other tropical fruits. Fruits have a very small amount of proteid, nitrogenous or meaty matter, and so fail of being complete foods. Thus bananas contain 1.3 per cent., avocados 1.0, oranges 0.8, and pineapples only 0.4 per cent. of this important ingredient. The chief food value of ordinary fruits lies in the carbohydrates (chiefly sugars) which they contain. Of these, bananas have 21 per cent, mangoes 15, oranges 11, and pineapples 8, on the average. Few fruits contain fats, the avocado excepted.

RUSSIAN WOOL PRODUCTION.—From a report of H.M. Consul at St. Petersburg (Hon. W. G. Thesiger), it appears that the total quantity of wool put on the Russian market in 1906 amounted to 28,081 tons, coming principally from the districts of the South Don and Caucasus. Deducting therefrom the remnant of the 1905 crop, the quantity of wool produced in 1906 was 25,194 tons, as compared with 31,806 tons in the preceding year. This decrease in the production is ascribed to various causes. On the other hand, a great demand for wool by textile manufacturers is stated to have existed, and this demand is expected to rise still more in the future. This increased demand is partly owing to the development which is taking place in the manufacture of woollen materials resembling furs, such as seal-skins, astracan, etc. For the latter purpose wool of the highest quality is required; and in view of this an increase in the importation of foreign wool is expected to take place during the approaching season.

JUDGING AT SHOWS.—Readers of the *Journal* will remember the discussion and correspondence that took place some three or four years ago in these pages on the subject of judging at agricultural shows. In a series of articles attention was drawn to some of the unsatisfactory features of the judging; and eventually, about the beginning of 1904, it will be remembered, the Natal Agricultural Societies' Judges Association was formed, with Mr. D. C. Dick as president. Readers will be interested to know that the movement has spread to the Orange River Colony, where—at Bloemfontein—the first Conference ever held in that Colony of Live Stock Judges was held during July, under the presidency of the Director of Agriculture (Mr. W. J. Palmer). A comprehensive agenda paper was laid before the Conference, and draft regulations were discussed. In the course of the address with which he opened proceedings, the Chairman explained that it was to reach a common understanding in the matter of uniformity in rules and regulations governing agricultural shows and of a proper system of judging—which, he said, was badly needed at the present juncture—that he had asked permission of Government to invite a few representative breeders, together with the Secretaries of the District Shows, to meet in Bloemfontein. On the motion of Mr. Schimpers it was unanimously agreed "That a Judges Association be formed consisting of practical farmers and other expert stock men with the object of suggesting suitable dates for district shows in the O.R.C., and of supplying expert judges for such shows when held, this Association to work in conjunction with the Department of Agriculture until a proper Agricultural Union has been formed." Members of the Association would be required to pay an annual subscription of £1 1s.; and on the occasion of their visiting shows they would get their out-of-pocket expenses from the district in which the show was held.

A REPORT ON NATAL TEAS.—An interesting report is furnished by the tea expert of *Tropical Life* to his journal on the samples of Natal teas shown at the South African Products Exhibition. Thinking that a comparison of the product with that of India and Ceylon might prove of interest he paid a visit to the Exhibition and drew tasting samples from the exhibits there. He obtained specimens from three estates, and was much struck by "the marked improvement" which has taken place in the make of the leaf since he last saw teas from this Colony: "indeed," he says, "they now bear favourable comparison in this respect with other British growths. One of the estates, especially, he remarks, merits commendation, for the leaf is of good size and tip, well made and finished, showing signs of great care in manufacture. "It is when coming to the liquors that one finds cause for disappointment," he continues. "The 'infused leaf' in all cases is too uneven in colour, brown mixed with green and occasionally blackish leaves, evidence of imperfect fermentation, leaving the liquors either too thin, as with Barnesdale teas, or too soft and flavourless, as with those from the other two estates. The Barnesdales were pale yellowish in cup, with a flavour similar to China moyunes, but which might be prejudicial to their sale on the London market. Were it not for this peculiarity they would be very similar in style and quality to some of the best that come from Nilgiri, in Southern India. The defects are such as can be easily remedied, and planters in the Colony are to be heartily congratulated on the success which is attending their efforts to improve the character of their output. Should the time ever come when the industry is sufficiently extended to allow Natal to export part of her crop, the teas will receive in London the consideration they deserve." Mr. Sim, in his report on Natal tea, says: "This came as a surprise alike to Mincing Lane men and to the public. They had not previously heard of Natal tea, and were exceedingly surprised at the quantity produced, and at the progress the industry is making. And though, as critics, they naturally felt themselves bound to express criticism on the product submitted, and to point out rather its faults and shortcomings than its perfection, they all admitted that the product was inherently first-rate, but that the treatment accorded was not quite that to which London was accustomed. Further, they appeared to agree with so many degrees of classification as were represented from Natal it would be useless to attempt bringing Natal tea before the public under that name unless many thousand tons of each grade were available, its present use being rather for blending with other teas so as to produce a uniform quality maintainable in quantity at all times. This then involves selling bulk into the hands of blenders rather than the establishment of agencies at which the maintenance of an adequate supply of any brand would be a difficult matter at present."

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

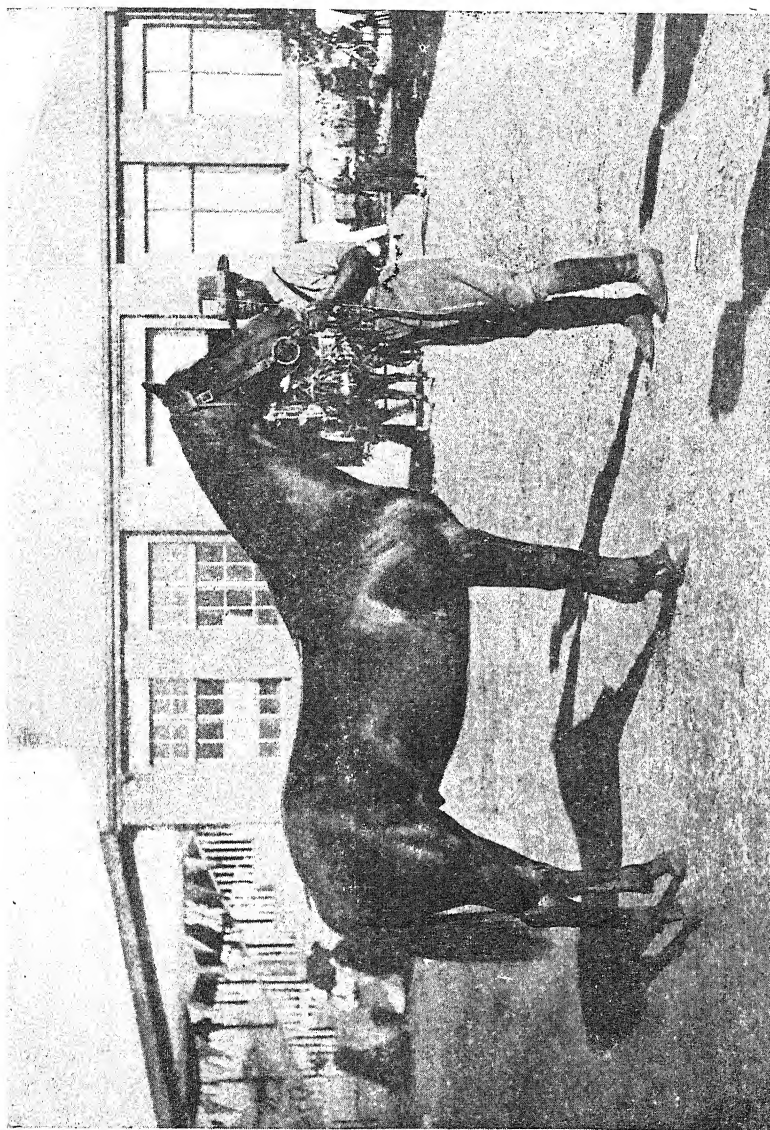
By E. R. SAWER, Director Experiment Stations.

II.

ALL types of tobacco are highly susceptible to changes of locality, and if several imported varieties be grown for a number of years from locally-saved seed, they will ultimately assume common characteristics derived from soil and climate, and lose their original distinctive features. The results of such a process may be seen in the so-called Natal leaf, which is the product of several distinct cigar tobaccos, and an example of the degeneration which may take place within a few years. It is advisable to frequently import from the locality where the particular tobacco reaches its highest excellence, and thus secure the qualities for which it may be famous. Such a system is now in vogue in all the older tobacco-growing countries, and a world-wide trade is being done in Cuban seed from the district of Vuella Abajo. In pursuance of this policy, supplies, as detailed below, have been secured for distribution to planters at cost price, and, it is hoped, a first obstacle to progress thereby removed. Tobacco is classified according to its employment, which may be as cigar filler or wrapper, cigarette-leaf, for pipe, plug, chewing, etc., and within each class a larger or smaller number of varieties is to be found, cultivated for the specific purpose in different localities. From these a small list has been compiled, based upon the experience of planters in the different Colonies of South Africa, though further modification will in all probability be necessary before definite selection can be made of standard types for Natal.

SELECTION OF VARIETIES.

Success in tobacco-planting must largely depend upon the careful consideration of climate, soils and markets, after which it remains for the grower to make trial of such types as have proved to be the best in similar conditions elsewhere. In general, greater heat is necessary for the production of aromatic tobaccos which are suitable for cigar fillers. The bulk of the world's supply of pipe and cigarette leaf is grown in the warmer portions of the temperate zone, while the cooler portions of this area give rise to their leaves with little aroma, but suitable for cigar wrappers. The lightest soils favour the growth of cigarette and bright pipe-leaf, heavier soils are sought for mahogany pipe-leaf and



ROYAL AGRICULTURAL SHOW.

First Prize Stallion (Class I.): "Bedouin," Chestnut. Exhibited by Mr. B. Johnstone, Volksrust.

chewing tobaccos, while the richest obtainable sandy loams are desirable for the production of cigar-fillers. In all cases, however, an excess of clay is to be avoided. The following classification and brief descriptions may afford some assistance in the matter of selection:—

Cigar Tobaccos.

Cuban.	Connecticut.
Zimmer Spanish.	Havana.
Sumatra.	Brazilian.

Cigarette Tobaccos.

Turkish (Aromatic, Cavalla, Smyrna, Samsam, Bafra).
Bright Virginian—Yellow Orinoko.

Light Pipe Leaf (for flue-curing).

Hester.	Warne.
Goldfinder.	Bullion.
Conqueror.	

Mahogany Pipe Leaf (for air-curing).

Honduras.	Medley Pryor.
Burley.	

Cuban.—Yields a small leaf, but if grown from imported seed retains much of the aroma of Cuba-grown tobacco. It is used for high-class cigars, both as fillers and wrappers.

Zimmer Spanish.—Yields a medium-sized leaf of dark colour and high flavour. Used for ordinary cigars as filler, and gives a heavy yield per acre.

Sumatra.—Yields a very thin leaf, of fine texture with small veins. Should be grown for cigar-wrapper, under cover of calico or laths if possible.

Connecticut.—Yields a very broad, fine leaf, strong, silky and elastic with small fibres; suitable for wrapper or filler.

Havana.—Very thin, fine leaf of delicate flavour. Used for wrapper and filler.

Brazilian.—Yields a coarser, heavier leaf than the above. Used for cheaper cigars, or for blending with better grades.

Turkish.—A very distinct type of tobacco, probably derived from South America. In Turkey is generally sun-cured, but in South Africa has also been successfully flue-cured.

Bright Virginian.—Grown in a variety of types. Leaves light-coloured and of delicate flavour. When flue-cured tobacco ranges in colour from a lemon-yellow to light mahogany.

Hester.—Yields a broad, heart-shaped leaf, fine-fibred and silky. Gives to flue-curing a very bright, yellow or mahogany pipe-tobacco.

Goldfinder.—A similar bright tobacco to the above, for growth on sandy soils.

Warne.—A very popular variety for the production of yellow, flue-cured tobacco.

Bullion.—A White Burley cross on Hester. Broad-leaved and of fine texture. Yields a slightly heavier, yellow to mahogany pipe-leaf to flue-curing.

Honduras.—A vigorous plant, and one of the best for mahogany pipe-leaf of medium strength.

Burley.—Yields a long, narrow leaf, which is white in appearance while growing. Suitable for rich, limestone soils, and the production of a heavy crop of full-flavoured pipe-leaf.

Medley Pryor.—Yields a very broad, soft, silky leaf with tough fibre. Should be grown on rich, heavy soils for the production of dark, full-flavoured pipe-tobacco.

PREPARATION OF THE SEED BED.

A majority of the failures in tobacco-planting originate in the seed-bed, and a careful study should be made of the dangers to which the seedlings are subject. Germination is somewhat protracted, and it is frequently a month or even six weeks before the plants appear above ground. This feature is of importance in view of the fact that even the most careful hand-weeding disturbs the tobacco roots and unduly weakens the plants. Every effort must therefore be made to secure a bed which is at the outset free from weed-seeds. This should be prepared as early as possible in winter, choice being made of a rich sandy loam in a sheltered position. After marking off the bed, which should not exceed four feet in width, brushwood and timber should be piled on the surface in sufficient quantity to maintain a strong fire for at least an hour. This will destroy both seeds and any insect eggs which may be present, and furnish a valuable fertilizer to the plants. While the ashes are still warm, the bed should be thoroughly dug over to as great a depth as possible, and raked to a very fine surface. All rubbish which might hinder the growth of the plants or their subsequent removal must be carefully removed, and the soil brought to a high state of pulverisation. The seed should then be mixed with 100 times its weight of fine ashes, or fine, dry earth, and sown at the rate of one ounce to a hundred square yards of seed-bed. If carefully handled a thimbleful of seed of the pipe-leaf varieties will suffice to plant an acre of tobacco, though ten times as many plants are required to cover an equal area with Turkish leaf, for which a closer spacing is adopted. A light roller drawn over the bed will afford ample cover to the seed, which should on no account be deeply buried. The surface should now be moistened with weak manure-water, prepared by mixing 10 lb. of poultry droppings in 12 gallons of water, and lightly covered with straw. A double course of bricks should then

be laid round the margin of the bed, upon which are placed hessian or scrim-covered frames for the protection of the seedlings against cold, heat and insect attacks. Too much emphasis cannot be laid upon the need for this precaution. Sowings should be made at intervals of a week to ensure a supply of transplants whenever the weather shall favour their removal to the plantation. It is useless to fix beforehand dates for this operation, as the planter must be ruled by circumstances prevailing at the time. The plants in the seed-bed must always have sufficient moisture and be kept growing vigorously. If the rainfall be insufficient, they should be watered with weak liquid manure as often as is needed. If weeds appear in spite of the above precautions, they must be removed by hand with the utmost care. It will frequently happen that the most careful sowing will result in an overcrowded bed, in which case the plants should be thinned by drawing a rake through them.

(To be continued.)

Austria produced, in 1906, 5,089,575 muids of maize, from an area of 847,471 acres. The area under oats was 4,531,063 acres, from which 21,415,814 muids were obtained. The production of barley was 20,213,189 muids, from 2,909,146 acres.

A LARGE SILO.—The largest silo in Australasia is, according to *Dalgety's Review*, one that has just been erected at Mr. F. G. Waley's Mowbray Park Estate, near Picton, New South Wales. It has a capacity of 600 tons, but is built of four separate divisions under one roof. These divisions are 24 feet high, are 24-sided, circular in construction, and are entirely air-proof, having no joints to permit the ingress of air. The walls are ferro-cement, fortified with steel webbing and wrought iron bands to take excess of pressure. The floors are concrete. By placing the silos in a group, all the emptying doors are put under cover, so that when the ensilage is being used a cart can be backed in and the ingredients loaded therein by means of a hopper. The doors are constructed upon the principle of a boiler manhole, with an insertion joint that is squeezed out, and this prevents any leakage of air—a common fault with most doors of tub silos. The silos cost £85 each, which is stated to be about 33 per cent. less than anything permanent in Australia so far.

Vlei Soils.*(Continued.)*

By ALEX. PARDY, F.C.S., Analyst.

THE bases found in solution in the water with which the soil was extracted were found to be in combination most largely as chlorides, sulphates, and carbonates. The acids determined were as follows:—

Sample.	Acid.	1st Foot.	2nd Foot.	3rd Foot.
No. 1 ...	Silicic ...	·003	·002	·001
	Sulphuric ...	·003	Trace	Trace
	Chlorine ...	·016	·018	·014
	Carbonic ...	·040	·010	·039
No. 2 ...	Silicic ...	·001	·003	·003
	Sulphuric ...	·004	Trace	·002
	Chlorine ...	·015	·017	·016
	Carbonic ...	·013	·048	·039
No. 3 ...	Silicic ...	·003	·004	·003
	Sulphuric ...	·004	·002	·002
	Chlorine ...	·012	·013	·012
	Carbonic ...	·049	·017	·057
No. 4 ...	Silicic ...	·002	...	...
	Sulphuric ...	·006	...	...
	Chlorine ...	·012	...	...
	Carbonic ...	·062	...	...
No. 5 ...	Silicic ...	·004	·003	...
	Sulphuric ...	·006	·002	...
	Chlorine ...	·013	·016	...
	Carbonic ...	·015	·017	..
No. 6 ...	Silicic ...	·004	·005	..
	Sulphuric ...	·015	·017	...
	Chlorine ...	·017	·012	...
	Carbonic ...	·052	·043	...
No. 7 ...	Silicic ...	·004	·002	...
	Sulphuric ...	·001	·003	...
	Chlorine ...	·003	·002	...
	Carbonic ...	·020	·040	...

NOTE.—Carbonic includes free carbon dioxide.

The predominating compounds in solution are those of sodium as chloride, carbonate, and sulphate, but even in the most highly charged soils these do not seem to be present in alarming quantities or in such that their removal could not be effected by drainage. Should irrigation be attempted without due regard to drainage, it is highly probable that an accumulation of the saline matter would take place in the soil to an extent depending on the frequency of the application of the quantities of water so applied and its contents of soluble constituents. With a corresponding system of drainage such disabilities are not likely to arise. Following the extraction of the soil by water, solutions containing mono-calcium phosphate, magnesium sulphate, calcium nitrate, and potassium sulphate in small quantities were passed through the same columns of soil in order to ascertain what amounts of the various constituents were capable of being retained by the soil. The solutions used were of a dilute nature: they contained 1.30, 0.81, 1.80, 1.720, 0.50, and 0.25 parts per 1,000 respectively of lime, magnesia, phosphorous pentoxide, sulphur trioxide, potash, and nitrogen. The filtrate from the soil was collected and the amounts which were passed through were, after determination, deducted from those which were originally placed in contact with the soil, the difference between the two being taken as the amounts held by the soil.

The following table will show the quantities of the various constituents so obtained as being held by the soil. The figures are given in grammes as per 75 grammes soil:—

Sample.	Salts.			1st Foot.	2nd Foot.	3rd Foot.
No. 1 ...	Lime	...	{ Passed Retained	.330	.282	.270
				.320	.368	.380
	Magnesia	...	{ Passed Retained	.208	.196	.173
				.197	.209	.232
	Potash	...	{ Passed Retained	.188	.194	.178
				.062	.056	.072
	Sulphur Trioxide	...	{ Passed Retained	.750	.753	.735
				.110	.107	.125
	Phosphorous Pentoxide	{ Passed Retained	{ Passed Retained	.008	.019	.015
				.892	.881	.885
	Nitrogen	...	{ Passed Retained	.085	.085	.100
				.042	.042	.027

Sample.	Sales.		1st Foot.	2nd Foot.	3rd Foot.
No. 1.	Lime	Passed	'335	'320	'290
		Retained	'315	'330	'360
	Magnesia	Passed	'223	'189	'189
		Retained	'182	'216	'216
	Potash	Passed	'157	'185	'198
		Retained	'093	'061	'052
	Sulphur Trioxide	Passed	'725	'730	'778
		Retained	'135	'130	'082
	Phosphorous Pentoxide	Passed	'039	'012	'025
		Retained	'861	'888	'875
	Nitrogen	Passed	'025	'120	'115
		Retained	'102	'007	'012
No. 3.	Lime	Passed	'270	'237	'294
		Retained	'380	'413	'356
	Magnesia	Passed	'200	'156	'156
		Retained	'205	'249	'249
	Potash	Passed	'154	'227	'197
		Retained	'095	'023	'053
	Sulphur Trioxide	Passed	'752	'751	'783
		Retained	'108	'109	'077
	Phosphorous Pentoxide	Passed	'015	'076	'068
		Retained	'885	'824	'832
	Nitrogen	Passed	'061	'075	'074
		Retained	'066	'052	'053
No. 4.	Lime	Passed	'209	...	...
		Retained	'441	...	...
	Magnesia	Passed	'195	...	...
		Retained	'210	...	...
	Potash	Passed	'207	...	...
		Retained	'043	...	...
	Sulphur Trioxide	Passed	'726	...	...
		Retained	'134	...	...
	Phosphorous Pentoxide	Passed	'055	...	...
		Retained	'845	...	...
	Nitrogen	Passed	'100	...	...
		Retained	'027	...	...

Sample.	Salts.		1st Foot.	2nd Foot.	3rd Foot.
No 5 ...	Lime	...	{ Passed	·244	·218
		...	{ Retained	·406	·432
	Magnesia	...	{ Passed	·190	·188
		...	{ Retained	·215	·217
	Potash	...	{ Passed	·166	·180
		...	{ Retained	·084	·070
	Sulphur Trioxide	...	{ Passed	·782	·748
		...	{ Retained	·078	·112
	Phosphorous Pentoxide	...	{ Passed	·140	·115
		...	{ Retained	·760	·785
No 6 ...	Lime	...	{ Passed	·155	...
		...	{ Retained	·495	...
	Magnesia	...	{ Passed	·105	...
		...	{ Retained	·300	...
	Potash	...	{ Passed	·238	...
		...	{ Retained	·012	...
	Sulphur Trioxide	...	{ Passed	·811	...
		...	{ Retained	·055	...
	Phosphorous Pentoxide	...	{ Passed	·125	...
		...	{ Retained	·775	...
No 7 ...	Lime	...	{ Passed	·168	·250
		...	{ Retained	·482	·400
	Magnesia	...	{ Passed	·176	·230
		...	{ Retained	·229	·175
	Potash	...	{ Passed	·203	·184
		...	{ Retained	·047	·066
	Sulphur Trioxide	...	{ Passed	·795	·851
		...	{ Retained	·065	·009
	Phosphorous Pentoxide	...	{ Passed	·092	·100
		...	{ Retained	·808	·800
	Nitrogen	...	{ Passed	·112	·100
		...	{ Retained	·015	·018

The soils vary individually in the amounts of the constituents retained, but they agree in their behaviour towards the various salts. It will be observed, for instance, that, if the average amounts of these constituents are separately considered, there is a decided preference shown for some over others, and each soil displays this characteristic to a greater or lesser degree. Taking the average percentages of each constituent retained, we have the following relative order clearly defined, viz.:—

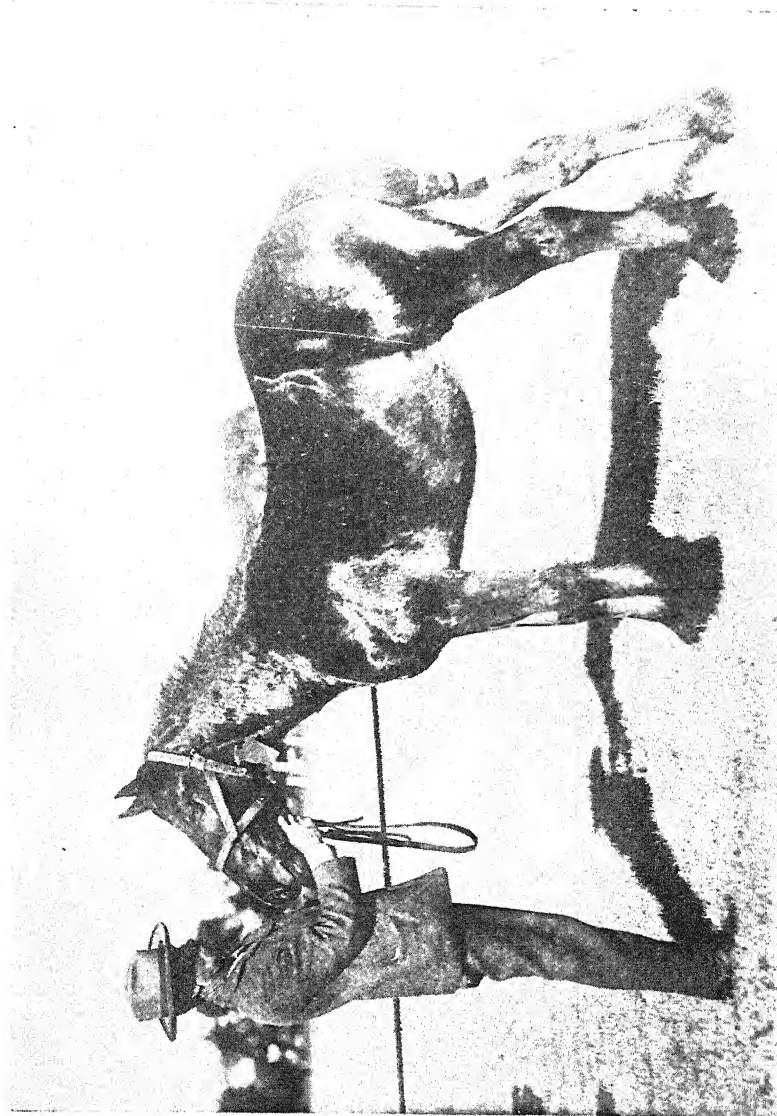
Phosphorous pentoxide	92.5	per cent. retained.
Lime	60.1	" "
Magnesia	55.8	" "
Potash	24.0	" "
Nitrogen	23.6	" "
Sulphur trioxide	11.7	" "

These proportions of the various ingredients were taken from the solutions by the soil whilst passing through it. All the constituents were in a water-soluble form, so that under the same conditions it is apparent that the soil has a greater power of retaining some compounds than others. Under the natural conditions occurring in the field, this would probably hold good under modifications induced by the various agencies pertaining to the soil, but the fact that the soil possesses this power in a varying measure is of importance in connection with the application of soluble manures.

It will be observed that the great bulk of the phosphoric acid, although soluble in water, is firmly held by the soil, and that the nitrates pass out very readily.

(To be continued.)

EXPORT OF OSTRICHES FROM O.R.C.—A recent issue of the *Government Gazette* of the Orange River Colony contains the text of a draft Ordinance for the imposition of a duty on the export of ostriches and ostrich eggs. It is proposed to levy a duty of £100 upon every ostrich and of £5 upon every ostrich egg exported from the Orange River Colony, provided, however, that no duty shall be payable on exports to any neighbouring State or Colony where similar legislation is in force. The penalty for the contravention of the Ordinance is to be a fine of not less than £25 and not more than £100 for each ostrich or egg exported contrary to the provisions of the law.



ROYAL AGRICULTURAL SHOW.
First Prize Bay Yearling : Bred and exhibited by Mr. Thos. Keel, Umloas Road,

Man's Influence on Climate.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE.

By T. R. SIM, F.L.S., Conservator of Forests.

At first glance climate seems so far beyond human influence that probably few have ever taken into consideration how much good or harm they are unconsciously producing, or at least have the power to produce, in respect to it.

But a closer inspection shows that man actually has an influence—usually unrecognized even by himself, but still active and effective—upon the climate of his neighbourhood. This influence is produced in several different ways, and is sometimes quite local, but at other times more widespread, and at least contributory, along with other causes, to climatic changes of the first magnitude, and affecting whole continents.

Among local influences may be mentioned the following:—

(1) *A local climatic change is effected by the production of shelter.*—Everyone knows that the erection of a stone wall, or the growth of a hedge or plantation, will alter the climatic conditions in the area sheltered thereby. This sheltered area may be very limited, but the practice is in common use in horticulture for the production of fruit and vegetable crops too tender to succeed without such artificial protection. It is also in common use in agriculture for the production of sheltered corners where stock can be comfortable during severe weather. This is simply the artificial extension on a small scale of the shelter of mountains and ridges by which nature on a larger scale provides for variations of climate affecting whole districts, but because more directly under control, and more local in its scope, is often more noticeably effective.

(2) *A local climatic change is effected by drainage.*—Farmers know to what an extent amelioration is produced through effective drainage of farm land, and though most farmers are inclined to attribute this, and to some extent correctly so, to the improved hygroscopic condition of the soil, it is also the case that the drier soil is warmer and more responsive, and that the surrounding atmosphere is similarly affected thereby. Land which formerly was liable to frequent and severe frosts may, if suitably located, be altogether free from frost after effective drainage, and, on the other hand, land which when dry has been frost-free, is liable to suffer from frost when artificially placed in a condition of saturation.

Drainage of large malaria swamp districts has been credited with

improving the climate to the extent of doing away with malaria, and the extensive planting of Eucalypts and other rapid-growing trees (which in itself is an effective form of drainage) has been similarly credited, and there can be no doubt but that an enormous climatic benefit has usually accrued, though the expulsion of malaria is a secondary and often misunderstood benefit arising rather from the production of conditions inimical to the malaria-carrying mosquito, than from actual destruction or non-production of miasma.

(3) *A local atmospheric change is produced in towns, and in the neighbourhood of factories, foundaries, mines, etc., by the emission into the atmosphere of smoke in sufficient quantity to produce haze or fog, or of gases having a deleterious effect on vegetable as well as animal life.*—Smoke is sometimes produced intentionally in horticulture on purpose to form a "smudge" sufficiently dense to prevent frost and to delay or render gradual the effect of bright sunshine after frost has actually occurred.

All the above are climatic changes produced by man, easily noticed, and more or less local in their effects.

But there are other changes taking place which are more gradual, less noticeable, but none the less important, brought about by the effect of vegetation on its surrounding atmosphere; and man's influence in maintaining or destroying this vegetation is the prime mover in the matter. "Forests precede a population and deserts follow it." has unfortunately been the case almost everywhere, and the difference between forest and desert in the relation of each to the atmosphere is immense.

There is a popular idea that forests produce rain, which, however, requires qualification. That some classes of forest do act in this way is quite true, but in other cases this is not so evident. The result in all cases is the effect of a natural law under which at a high temperature the atmosphere can carry a larger amount of moisture than it can at a low temperature. Consequently, when a warm air-current passing over the sea landward absorbs from the sea its full proportion of moisture, and afterwards comes in contact with a colder surface or a colder air-current, it is no longer able to maintain the moisture it contains, and precipitation as rain follows. A warm moisture-laden cloud striking against a cold mountain or cool forest has its own temperature reduced thereby, and gives off part of its moisture as rain, mist or dew. But in this the nature of the surface it strikes has some effect. A bare sandy soil is by day warm and dry, and so not only draws no moisture from the cloud but actually repels rain so long as it is warm enough to add heat to the atmosphere above it. On the other hand, a cold solid mountain mass produces a sudden chill on a warm cloud, and the result is the heavy showers so common in mountain districts.

But forests have a further effect. Besides being usually located on the shady and cool side of a cold mountain, the natural tendency where there is a mass of foliage overhead and a more or less open space below

is to produce under this canopy a considerable mass of an atmosphere much colder and more permanently cold than that existing where the canopy is absent. This coldness is further augmented where the humus produced by decaying leaves forms a deep hygroscopic mass in which every drop of rain that falls is retained instead of running off at once into some stream. Everyone knows the chilly, damp atmosphere usually found inside a forest, and which naturally spreads more or less for some distance around and above the forest. A warm moisture-laden cloud coming in contact with such an atmosphere is reduced in temperature and consequently yields part of its moisture as rain, while even cold clouds usually find the forest atmosphere colder than themselves, and consequently continue to lose moisture by precipitation as dew, or show it as mist, long after more open country shows no effect. It will be noticed that cloud and mist are only produced when the local temperature falls low enough to render the moisture present in the air visible, without actually falling, hence the constant variation in the form of cloud with every fresh contact with warmer or colder air; hence also the mist in a valley during or after frost, and the mist on a mountain-top while all is clear below. Immediately after precipitation ceases and the warm atmosphere is again able to maintain what moisture remains in it, a return action commences by which the warmer cloud draws from the moist atmosphere below, and from the ground, moisture up to its full carrying capacity, and thereby a condition of saturation and of visible cloud is maintained in and about the forests more than elsewhere.

Man's action therefore in maintaining and in producing forests of a satisfactory class has a beneficial climatic effect where, as in South Africa, more moisture is desired, while in localities like Siberia, Russia, Scandinavia, and Canada, where the proportion of forest is naturally high and the temperature low, an improvement in climate can be effected rather by the removal of part of the existing forest.

Where removal goes on to the extent of thinning out a large amount of forest, leaving open gaps or glades, insolation goes on almost as in the open; canopy is practically absent: the cool moist forest atmosphere also disappears, and the cooling effect upon rain clouds is only that produced by the coolness of the actual foliage. Countries then which, like some of the American States, have been felling timber for many decades, at a rate faster than regrowth grows, naturally affect the local climatic conditions; slowly, it is true, but none the less surely. And when State after State continues this operation, or carries it out simultaneously, the result is all the more widespread, and all the more likely to affect adjoining districts.

And when in localities, as in South Africa, where the total forest area is small, part is thinned out in this way without such protection being afforded as allows a dense regrowth to follow, the result naturally is that the former forest atmosphere dries out, the surface herbage becomes

parched, and a forest fire sooner or later finds its way in, and destroys the remaining vestiges of forest growth. And where trees are naturally sparse and xerophytic, as in South African thorn scrubs, evolution gradually produces in them an ability to withstand drought or even fire, or to suffer less from it, while undergrowth is annually burned clean off. In such case the effect upon the atmosphere is only what is produced by the foliage itself, and usually that foliage is of the small and gradually disappearing nature characteristic of such localities.

But to return again to heavy forest, and especially in regard to afforestation in South Africa, it is noted that the effect of cover is more pronounced under trees which form heavy canopy and produce much humus than under trees of lighter canopy, or where humus is scarce. This accounts to some extent for the remark already made that in regard to some kinds the statement that forests produce rain requires qualification, for the trees of light canopy and small humus are usually the Australian Eucalypts and Acacias, trees which often have their leaves or phyllodes more or less vertical, and consequently of slight protection against insolation, and whose leaves do not readily decay and consequently form poor humus. But, along with this, these trees are of exceedingly rapid growth, and transpire the enormous amount of moisture necessary to allow the fixture of the carbon forming leaves and stem. To do so they must draw it from the soil, and it is found, in actual practice, that, though these trees do cause a considerable amount of precipitation, their powers of transpiration and evaporation are even greater, and that they actually pass off more moisture than they draw. To keep that up a natural water-supply in the ground is required, and it is taking advantage of this fact that has led to the use of certain trees for the purpose of drying swamps. They actually draw the moisture from the ground into the atmosphere and sometimes form a valuable natural drainage where absence of fall prevents artificial drainage being adopted.

The moral of all this is that in South Africa wherever forest is formed or maintained in a sufficiently dense condition and of kinds not too absorptive of moisture, but still sufficiently humus-producing, then the result in regard to the local climate is a reduction of temperature and an increased amount of rainfall or other precipitation, with a slight tendency for these results to be felt to some extent in the surrounding district. On the contrary, where the density of a forest is not maintained, or where the kinds used require more moisture than they attract, gradual dying out may be expected, or the gradual evolution of the trees into more xerophytic forms, or the gradual substitution of such forms instead of the broader-leaved kinds, while the overhanging atmosphere gets gradually drier and drier. All this is a matter more or less under man's control, but it does not end here.

The effect produced by the canopy and humus of trees in dense

forest is also produced, though in a lesser degree, by the close vegetation and natural decay of good grass-veld.

That "every blade of grass has its own drop of dew" is absolutely true wherever moisture-laden atmosphere comes in contact with foliage colder than itself; and where there is a dense green sward with a moist undermulch of decayed foliage, the herbage is cooler than the atmosphere during night, with the result that an immense precipitation takes place. The beneficial effect of this dew has always been recognised, but its volume is often under-estimated, especially that from driving mist, which has been shown by Dr. Marloth to measure 80 inches in two months during the rainless summer, on the top of Table Mountain, when collected by rushes standing out of the rain-gauge, as against five inches in the same period collected in an ordinary rain-gauge alongside.

Such a precipitation, collected by the foliage and retained by the humus has an immense effect on the local climate as compared with what happens when the grass is all burned off annually, the humus destroyed by fire, and the moisture-attraction completely destroyed. And this contrast is the more marked when after many years of veld-burning, and that occasionally out of season, the good grass gradually disappears and there grow instead scattered tufts of weeds, wire-grass, or karroo-bush, separated by wide stretches of bare surface, usually washed clear of soil or hardened almost like rock. No attraction for moisture exists there, heat is reflected by day and radiated by night, and the consequence is an atmosphere rendered all the more fit, by increased temperature, to carry all the moisture it may contain.

Now, just as the moist forest atmosphere has a tendency to affect its immediate surroundings, so also have dry carroid conditions a tendency to spread, through the hot atmosphere being able to carry its moisture further and further away, while at the same time the absence of vegetation on the carroid area renders the pasture demand on the land around it all the greater if the small amount of stock and game in the neighbourhood is to continue to subsist there. The amount of travelling to and fro in search of water and in search of food also tells considerably on what vegetation remains, and tends to further denude and consolidate the intervening surface.

Now, throughout Africa the amount of nearly bare karroo is enormous, and its proportion to the whole area is so great, while that of forest and even of good grass-veld is so small, that the total tendency is toward an extension of karroo and a diminution of forest. This is meantime the natural course of events, and has been so for a long time. It is on record that Egypt was fairly well watered and comparatively green until the introduction of the camel led to the browsing off of the tops of the trees and bushes, and brought them to a size at which goats could easily complete the work of destruction.

So also in the adjoining Arabia and Persia, and a huge area trans-

formed by the consequences of such small beginnings from a fertile condition into an arid desert forms now a drought-centre from which desiccation continues to spread.

So also in South Africa, the grazing of the karroo, the burning of the grass-veld, and the tramping of stock to and from water, have effected and are still effecting changes in the veld and in the atmosphere, which can only end in universal desert, unless means are taken to prevent this.

Moffat noticed the gradually increasing drought as it affected the Kuruman and other streams of his district which have now become totally dry river-beds; Livingstone noticed a similar action already going on in the Lake district of Central Africa; Brown noticed it in regard to Lake Ngami and elsewhere; and any farmer of many years experience in the districts adjoining the South African karroo can relate how the vegetation has altered within his time from a fairly good grass-veld into a condition of more or less decided karroo. This I have witnessed personally within the past 20 years in districts of Aliwal North, Burghersdorp, Wodehouse, Barkly East, Steynsburg, Tarkastad, Queenstown, Cathcart, Stutterheim, Kingwilliamstown, Peddie and East London, in all of which the gradual transition in its various stages has been painfully manifest. The rush swamps which used to be so common in the upper portions of these districts have altogether disappeared, tall waving rooi-grass has given place to dwarf quacucouch, this has been replaced by karroo-bush or small weeds; enormous erosion has taken place in some places through absence of roots to hold the surface, and the accumulation of salts in the flatter parts of the valleys has produced sterility through brackness, while the increasing dryness has rendered the forests retrogressive rather than aggressive, and this effect has been accentuated by the grass fires annually encroaching into the forest margin, and occasionally breaking through and doing damage inside.

In all this there can be no question but that man has in his power, at least to a considerable extent, the control of the climate.

It is, however, no longer a local matter influenced by the action of any one individual, but a public question, requiring co-operative action which best takes the form of Government control, on purpose to check the progress of such widespread disaster as threatens sooner or later to overtake the whole of Africa, as it has already claimed much of the karroo in the south and of the Sahara in the north, as well as Egypt, Arabia, and Persia.

It may be asked in what way can man improve matters. The destruction is evident and increasing, but what can be done to stop it without interfering with the present utilisation of the land?

Much, and in many ways.

The culture of crops supplying winter-feed allows what is considered a summer stock of cattle to be maintained all the year round

without inflicting hardship either on the veld or on the stock. The disuse of grass-burning and its substitution by paddocks grazed in rotation but never injuriously grazed, does much to maintain or improve the climatic condition instead of allowing it to drift; while feeding stock by manure-grown crops upon such paddocks gives them a manurial improvement so long as the grazing is in moderation and beef or wool the only crops removed.

I am aware that popular prejudice is in favour of grass-burning and to some extent against the culture of winter-feed, but that is only in relation to the pastoral agriculture which is now rapidly giving place in most localities to more intensive farming, which latter requires the adoption of methods specially fitted for its use, and the abolition of such methods as no longer fit the altered practice. Veld-burning has its use in some circumstances, but its habitual use as a yearly practice must give way, if only as a public precaution against the more rapid spread of that desiccation which already has its grip all too firmly on South Africa.

The production of abundant foliage, by whatever means, has a tendency in the right direction, so long as the soil is able to maintain that foliage, and in this respect cultivation plays an important part. Frequent and deep cultivation produces and maintains foliage better than an annual shallow culture, and so also frequent surface scuffling maintains an open soil-surface which attracts and retains moisture from the atmosphere much better than a hard surface or a bad veld does.

Intensive farming is to be commended then in this respect, even apart from its profitable nature and its economic advantages.

But it is more particularly in the extension—the enormous extension—of plantations of moisture-attracting trees that climatic improvement is assured, or at least that a check can be put upon the rapid desiccation now going on. In Europe 25 per cent. of the total area is considered a fair proportion under forest in order to secure suitable climatic conditions. In South Africa, with its higher temperature and lower average rainfall, even a larger proportion is necessary, while the actual area under forest of all kinds is much less than one per cent.

Even much of the existent plantation forests are of kinds of doubtful advantage in this respect, their rapid growth causing more moisture to be used than is attracted by them. But even there an advantage is gained in this, that winds dried out by contact with such plantations naturally become warmer and lighter by the loss of their moisture and rise, leaving their places to be filled by further moisture-laden clouds from the sea, and thus a constant pumping arrangement from the sea on to the land is automatically produced.

This same kind of action secures that, wherever there is forest fit to draw moisture from a cloud, a further supply of moisture-laden atmosphere rushes in from seaward and keeps up the supply, or even passes onward to the next point of attraction; so that the forest, instead of

exhausting the atmosphere of its moisture, rather aids in keeping up an increasing supply.

As already mentioned, the kind of tree used for plantation work materially affects the result from a climatic point of view, and in this the quick-growing and consequently rapidly remunerative kinds are the least beneficial. Slow-growing species, producing dense canopy and humus, are the most useful climatically, and since these are so long in bringing in returns that the private planter omits them from his plantation, there is the more reason why the various Governments should act energetically in forming large plantations of these kinds. Want of funds is the common excuse, but the Cape Colony has set a good example in carrying on this work from loan funds on the principle that it is expenditure which will ultimately be remunerative. Of that there cannot be any doubt if the work is skilfully and economically performed, even apart from the question of climate, but the climatic importance is so great as to practically outweigh all other considerations and warrant even huge expenditure. The drying out of South Africa is at present going ahead at an enormous and rapidly increasing pace, much accelerated by the methods of pastoral agriculture in use; cattle diseases have rendered that form of industry unremunerative or doubtfully and irregularly remunerative. Intensive culture and rotation grazing are steps towards production without prejudicial effect on the climate, but it is in plantation work, and especially Government plantation works of slow-growing and humus-producing kinds of trees, that any safety or even precaution against increasing desiccation lies.

A SOUTH AFRICAN COMMERCIAL AGENCY.—*Reuter* announces the formation in London of "a power organisation" to advance South African interests. Sir Pieter Bam is Chairman of the new organisation, which will maintain the Exhibition Committees and assist the South African Governments to form a Commercial Agency to push South African products in Great Britain and British goods in South Africa. Facilities will also be obtained for South Africans to inspect British farms and manufacturing centres. Special attention is to be given to young Dutchmen visiting England, and to induce people with capital to take up agriculture in South Africa. Offices will be established in London and Capetown. For the purposes of the formation and carrying on of the organisation, it is stated in the cable that already Mr. George MacLachlan, of Glasgow, has given £500 per annum and Sir Richard Cooper and others £100 per annum for seven years.



ROYAL AGRICULTURAL SHOW.
First Prize Cart Horse, in Harness. Exhibited by Pietermaritzburg Corporation.

Parliamentary Notes and Notions.

By "SCRUTATOR."

Maritzburg, 20th July, 1907.

THE Houses of Parliament are once more the scene of life, and the business of the Session is now in full swing. In consequence of the absence in England of the Prime Minister at the Colonial Conference, Parliament did not meet until Tuesday, 25th June. The opening ceremony was performed by His Excellency the Administrator (Mr. Justice Beaumont) in the Town Hall.

Federation.

The Speech from the Throne contained reference to several matters of interest to farmers. After referring to the intention of the Transvaal to retire from the Customs Convention on the 30th June, 1908, His Excellency stated the opinion of Ministers that, upon the establishment of Responsible Government in the Orange River Colony, the time would have arrived for the discussion of the question of the federation of the British States of South Africa. He added that Ministers would be prepared to ensure the adequate representation of this Colony at any Conference that might be convened for that purpose.

Shipping Freights.

Reference was made in the Speech to the vexed question of shipping freights; and, speaking on the same subject during the debate in the House on the Address-in-Reply, Mr. Moor stated that he had brought to the notice of the shipping people "the unfairness to this Colony with regard to disparity of rates between South African ports and here, and he had done his best to get an amelioration of the rates, which he looked upon as almost intolerable for Durban. He had had submitted to him figures which went to show that Durban, in spite of all that had been done in regard to the improvement of the harbour (which he was proud to declare was second to none in South Africa), was handicapped by the through rate from Europe to Johannesburg, and made it the dearest of any port. He asked what would have been the condition of things when it became generally known that under the existing conditions Durban was the dearest harbour for getting at the Johannesburg centre?" What Mr. Moor has been able to effect in the way of reductions will be seen from the following statement. The rates have been proposed by Sir Donald Currie, with the approval of ship-owners:—

	Present Rates.		Proposed.	
	s.	d.	s.	d.
CLASS I.				
Capetown	42	6	42	6
Algoa Bay	42	6	42	6
East London	48	9	48	9
Durban	52	6	50	0
CLASS II.				
Capetown	31	3	30	0
Algoa Bay	31	3	30	0
East London	38	9	37	6
Durban	40	0	37	6
CLASS III.				
Capetown	25	0	25	0
Algoa Bay	25	0	25	0
East London	32	6	30	0
Durban	32	6	30	0
CLASS IV.				
Capetown	22	6	22	6
Algoa Bay	22	6	22	6
East London	30	0	27	6
Durban	30	0	27	6
CLASS V.				
Capetown	20	0	20	0
Algoa Bay	20	0	20	0
East London	27	6	25	0
Durban	27	6	25	0

Agricultural Department.

Ministers were impressed with the necessity for the fullest development of the agricultural possibilities, and for the better exploitation of the mineral wealth of the Colony, said His Excellency; and no efforts would be spared to attain those ends. One method which Ministers felt convinced would be of material assistance would be the establishment of an Agricultural Loan Fund, to provide for which a Bill had been prepared on the lines of similar legislation in other Colonies.

The vitalising of agricultural conditions with a fresh flow of money obtainable on easy terms is undoubtedly, as Mr. Moor pointed out in the House on one of the first evenings of the Session, one of the factors which will go far towards the lifting of the depression that at present over-spreads the country. Too much importance had in the past, he said,

been attached to the mineral wealth of South Africa in general and of Natal in particular. Mr. Moor was not decrying the mineral possibilities of the Colony when he said this—and he took care to emphasise that fact—but he recognises that true stability can only arise out of the steady development of the agricultural resources of the country.

Agricultural Credit.

Briefly, in the words of the full title, a Bill “to authorise the Government to assist persons engaged in agricultural and pastoral pursuits by loans on immovable property, and to appoint a Board for the management and administration of a fund created for that purpose,” has been introduced. The fund is to consist of such sums as Parliament may from time to time grant for the purpose, and is to be administered and managed by a Board consisting of five Commissioners appointed by the Governor. The Governor may also, from time to time, borrow to the extent of the whole of the unused balance, amounting to £700,000, of the loan of £1,000,000 provided by Section 63 of the Agricultural Development Act, 1904. Advances may be made by the Board to farmers and land-owners for any of the following purposes:—(a) To pay off existing liabilities; (b) to effect improvements, including water pumping and storing and irrigation, fencing, clearing land and cultivation, planting of orchards, etc., farm buildings; and (c) for the purchase of live-stock and plant. As security in making advances, the Board must have a first mortgage on land of either of the following classes, such land not being within the limits of any borough or township:—(a) Freehold land; (b) quit-rent land; and (c) land held under agreement of purchase from the Crown. The amount advanced is in no case to exceed three-fifths of the value of the land as determined upon by the Board; and, for the purpose of arriving at such value, the Board may in its discretion add the value of any immovable property already on the land in question or intended to be erected thereon with the proceeds of the loan applied for.

The extent of the loans that may be granted is confined within a certain minimum and maximum. No loan is to be for a less amount than £50 or for a larger amount than £2,500; and, further, no person who is already indebted to the bank to the extent of £2,500 can receive any further advance. That the fullest possible advantage is to be given to the farming community as a whole from the Act, is evidenced by the provision that all applications for advances under £500 shall have precedence over those for a larger amount. The interest chargeable for loans is to be fixed by the Governor by regulation.

Loans will come under two categories: money advanced for a limited period not exceeding five years, repayable at the end of the period of

the loan—known as a “fixed loan”; and money advanced for a period not exceeding thirty-five years, repayable by instalments during such period—described as an “instalment loan.” A fixed loan will be repayable (without sinking fund) at the end of the term for which it is granted, provided that the mortgagor may, at the date on which the half-yearly interest is due, repay any sum not less than £5, or a multiple thereof, in reduction of the principal sum. Instalment loans, with interest thereon, will be repayable in not more than seventy half-yearly instalments. Provision is made that all monies advanced by the Board shall be applied strictly to the purpose for which the loan was granted; and it will be the duty of the Board to see that this is done.

Land Banks in the Cape Colony and Transvaal.

Natal does not stand alone in the matter of the proposed creation of a Land Bank. Cape Colony and the Transvaal are both introducing the necessary legislation for a similar purpose; and a *Reuter's* telegram at the end of June described the Cape Agricultural Credit Bank Bill as “the most important measure of the Session.” It may be of interest to examine the proposals of the Cape and Transvaal Governments in the direction of the establishment of agricultural credit systems in their respective Colonies.

The raising of the necessary funds for the Cape Bank is to be accomplished by means of debentures on the guarantee of the revenues of the Colony, up to a maximum of a million sterling; whilst in the case of the Transvaal, the funds of the bank are to include such monies as Parliament or the Governor may from time to time vote or place at the disposal of the bank. In both Colonies, as in Natal, the funds of the banks are to be managed by boards of five members. In the Cape Bill the loans which may be granted range from £50 to £5,000; in the Transvaal the minimum is £100 and the maximum £3,000. In both cases, as in the Natal Bill, applications for advances under £500 are to have precedence over those for a larger amount. Provision is further made in the Cape Bill for the advancing of sums not exceeding £10,000 to Co-operative Farmers' Associations.

In the Cape measure the following are the purposes specified for which advances may be made to farmers:—(a) To pay off existing liabilities in cases in which the Board approves of an advance for improvements; (b) to effect improvements, including water storing and irrigation, fencing, clearing lands for cultivation, planting of orchards and vineyards, and farm buildings; and (c) for the purchase of stock and plant. The Transvaal Bank will be empowered, it is proposed, to make advances for the following purposes:—(a) The promotion of agriculture, grazing,

horticulture, or of a dairy, and of rural industries generally: (b) the purchase of stock, machinery, seeds or implements: (c) the addition of any improvements to any agricultural land, such as buildings, fences, irrigation works, dams, or furrows; (d) the payment of liabilities already existing on any land; (e) the purchase of any land for any of the purposes described in (a), (b) and (c), by a person whose financial resources are deemed adequate to carry on such purposes.

The Natal Bill in Parliament.

Our Parliament has very favourably received the Land Bank Bill, which has brought to the Government some praise from members imbued with Australian ideas. At the second reading of the Bill some of those Members even thought the measure did not go far enough, and there was some discussion as to whether the provisions of the Bill would enable assistance to be given to leaseholders. It was stated that in the Australasian States money could be borrowed on the security of leasehold land, and that, if the full benefit was to be derived from the Natal venture, we should make corresponding provision in our Bill. Mr. Moor pointed out, in reply, that small holders would derive greater benefit from the Bill than "large" farmers, by reason of the proviso in the Bill to the effect that precedence would be given by the Bank to applications for loans under £500.

Mr. Deane, in moving the second reading of the Bill, after explaining the *modus operandi* of the measure, pointed out some of the beneficial effects that would attend the establishment of a Land Bank in this Colony at the present juncture. The Government, he said, were taking a practical step in the direction of developing to its fullest capacity the land of the Colony, and what they wanted to aim at first was to provide what the people of the Colony required, and to serve the markets of South Africa; and, secondly, to produce a surplus which would find a market overseas, and bring into the Colony its equivalent in capital. Every ton of produce raised in the country meant increased work for the railways and increased wealth for the Colony, while every ton imported meant the depletion of the Colony of its equivalent in capital. Increased production, as Mr. Deane said, means decreased cost, and the cost of living will become cheaper; and the Minister pointed out that when the farmers were in possession of the money they would be able to obtain from the Land Bank, it would be put in circulation amongst the merchants in this country, and would thus give an impetus to business generally.

On the House going into Committee on this Bill, Mr. Evans moved, and it was resolved, that the Bill be referred to a Select Committee for consideration and report. This Select Committee consists of Messrs. Clayton, Bosman, Smythe, Oliff, Walker, and the Minister of Agriculture.

Land Tax.

Among the Bills before Parliament are two to provide for the taxation of unimproved land values. "Unimproved value" is defined as "the capital amount for which the fee simple estate in such land would sell under such reasonable conditions of sale as a *bona fide* seller would require assuming the actual requirements and improvements by the owner or occupier, if any, had not been made; and in case of conditional purchase land of which no title shall have been issued after deducting also the balances or amount of purchase money due to the Crown in respect of the same." It is sought to impose a tax upon the value of all unimproved lands in Natal with the following exceptions:—(a) Land of the Crown and Native Trusts not subject to any agreement or purchase and sale; (b) land belonging to the Imperial War Department or Admiralty; (c) land situated within the limits of any municipality, township established under Law No. 11 of 1881, as also land brought within the provisions of the Water Supply Act, 1897; (d) park lands, public roads, public cemeteries, or other public reserves; and (e) lands held in trust when used exclusively for religious purposes. The tax, together with all fines, costs, and charges lawfully claimable in reference thereto, is, until payment, to be a first charge upon the land taxed, in priority to all sales, conveyances, mortgages, charges, liens, rates, and encumbrances whatsoever. In the second of the two Bills it is proposed to fix the tax—which will be leviable as from the 1st July, 1907—at the rate of one penny in the pound, with a minimum of £1 in the amount payable by any person yearly. Section 2 of this Bill enacts that "any owner not personally occupying his holding, or each separate holding owned by him, if more than one, of land subject to the tax, shall, in respect of each holding not so occupied, pay double the amount of land tax, as provided by this Act, unless he shall satisfy the Commissioner that for a period of at least six months during the financial year preceding that for which the tax shall be payable such holding has been occupied by a European who shall have carried on *bona fide* farming or agricultural operations thereon. In the case of purely grazing farms the occupation period as aforesaid shall not be enforced: Provided that in case any rent is levied from such farm, either from Native or Indian tenants, the double tax shall be paid, and provided further, that whenever the Commissioner shall be satisfied that any lands are unfit for European occupation, and that no Native or Indian rents are levied thereon, the provisions of this section shall not apply to such lands."

East Coast Fever.

In addition to the Bill dealing with East Coast Fever referred to in the last issue of the *Journal*, an important measure in connection with the suppression of the disease has been brought in by the Government this Session, in the shape of a Bill "to provide for the compulsory fencing of

lands within the Colony of Natal." This Act will empower the Minister of Agriculture to cause the erection of fences along the boundaries of any farms within an infected or suspected area, or of any native location or town lands within such an area. The cost of erecting any such fence along the boundaries of a farm will in the first instance be defrayed by Government from funds voted by Parliament for the purpose. The money thus spent will then be repayable, in equal yearly instalments, by the owner of the farm fenced—or, in the case of the erection of a fence along the common boundary of two adjoining farms, by the owners of those farms in equal portions—together with interest at the rate of 5 per cent. per annum. Such instalments will commence two years after the fencing is completed, and will be so calculated and fixed that the initial cost, together with the interest, will be wholly repaid within a period of ten years from the date from which the first instalment becomes due. With regard to the erection of fences upon farms held under lease, it is provided that the lessor shall be entitled to receive from the lessee a payment of 8 per cent. per annum on any sum he may have paid to the Minister of Agriculture. Such payment shall be deemed in law to be part of the rent of the farm. It will be permissible for any person liable for the cost of the erection of a fence under the Act, to contribute "approved material or labour or transport towards the cost of such fence"; and he will be credited with the value (determined, in the absence of agreement, by the Resident Magistrate of the district) of such contribution. —

In addition to the fencing of private farms, native locations, and town lands, the Minister of Agriculture will have power to cause to be fenced (a) any roads, public or private, traversing any part of the Colony; and (b) any boundaries of the Colony or any area in the Colony marked off from any other part of the Colony. —

A further Bill of interest is one to be introduced "to amend Act No. 53, 1906, entitled Act "To authorise the Governor to borrow the sum of £100,000 from the Consolidated Loans Fund, to be used for the prevention or suppression of the disease known as East Coast Fever." In substitution of Section 3 of the Act referred to, it is proposed that the purposes to which the Act applies shall be for the advancement of loans to owners of cattle or others who are in need of such assistance for fencing their lands, for purchase of transport animals or otherwise for the prevention or suppression of East Coast Fever; and for the purchase by the Government of such donkeys, mules, horses, wagons or gear as may be necessary for the establishment of a transport service in any district in which the movement of oxen may be prohibited under the provisions of the East Coast Fever Act, No. 32, 1903, and all amending Acts which are now in force or may hereafter come into force and any regulations made thereunder.

The Economic Side of Agriculture in Natal.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE.

By E. T. MULLENS, Secretary, Minister of Agriculture, Natal.

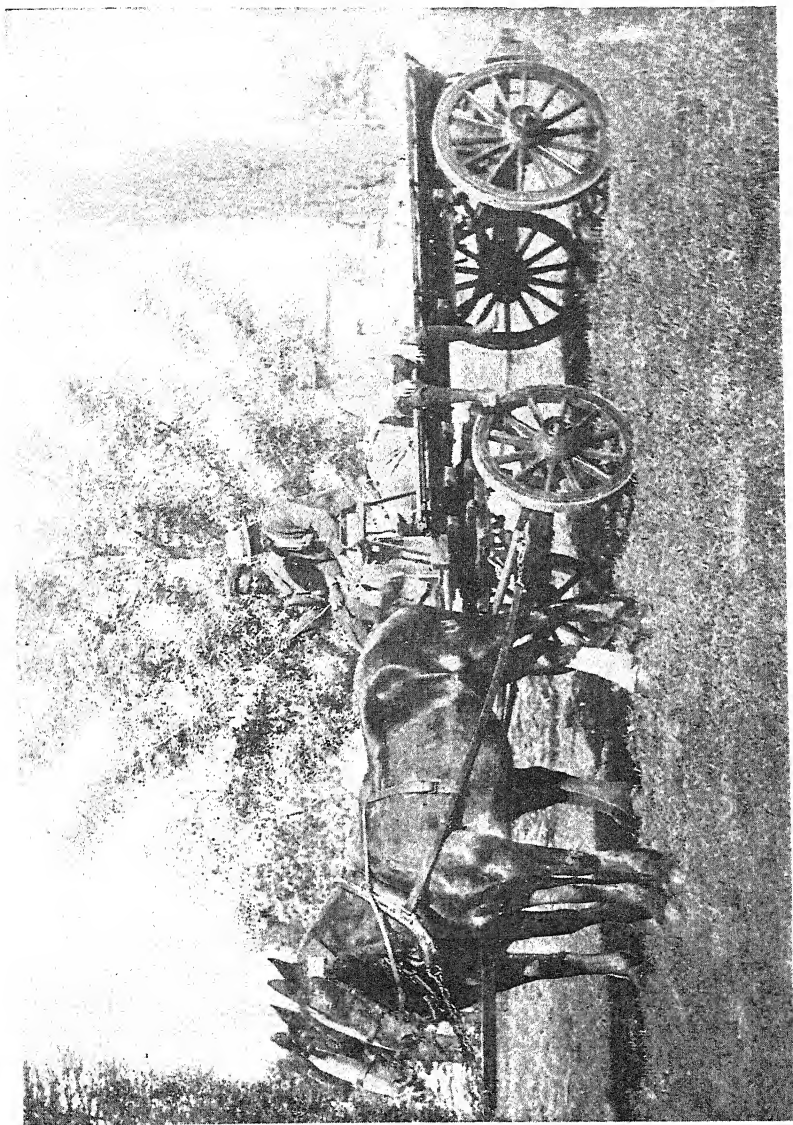
THE LAND QUESTION.

IN order to secure a true view of the economic side of agriculture in Natal, we must know the amount of land used or required by Natal agriculturists and the ratio this bears to the area available for agriculture.

Persons adversely criticising agricultural methods in this Colony are wont to compare our agricultural output with the total area of the Colony, overlooking the fact that an enormous tract of country is occupied by native locations, and, further, not making allowance for the large area granted for commonage to the various townships and villages, nor for the Berg lands or the Thorn Country, neither of which will furnish grazing for stock during more than one-half of the year, rendering it necessary for persons farming stock on a large scale in those localities to have two farms, a Berg farm for summer and a Thorn farm for winter grazing.

	Aeres.
The total area of Natal, <i>not including Zululand</i> , is approximately	16,000,000
The native locations in Natal are, approximately, in extent	2,500,000
The commonages of townships and villages are, approximately, in extent	100,000
There are still unalienated, approximately	1,000,000*
	<hr/> 3,600,000
The amount of land alienated to white people is, therefore, approximately	12,400,000
Of this acreage, our agricultural statistics show us that the white population cultivates	400,000
The grazing required for the stock shown to be in the possession of the white population is, approximately	5,000,000

* These unalienated lands are mostly on the slopes of the Berg and in the Thorn country, and are, generally speaking, rough and broken and inaccessible.



ROYAL AGRICULTURAL SHOW.
First Prize pair of Trolley Horses in Harness. Exhibited by Pietermaritzburg Corporation.

The Indian population of Natal cultivates, approximately, one-tenth of the quantity cultivated by the white people	40,000	
The grazing required for the stock shown to be in the possession of the Indian population is, approximately	60,000	
	<hr/>	5,500,000
<i>This leaves unaccounted for ∴</i>		<hr/> 6,900,000

In respect to this acreage, there must be borne in mind the native tenants occupying farms owned by the white population and running stock thereon. It is difficult to arrive at any satisfactory statement regarding native cultivation and stock on such land. If, however, we take it that on those lands there are half of the total (*i.e.*, inclusive of locations) cultivation and stock of natives—which I do not think will be very wide of the mark—then we also have to make allowance for land cultivated by natives on farms owned by white people

240,000

Grazing required for stock belonging to natives and running on farms owned by white people

2,660,000

2,900,000

Unaccounted for

4,000,000*

In estimating the area required for grazing on the ordinary veld of Natal, I have allowed ten acres for each head of cattle or a horse, and two acres for each sheep or goat; which I am advised by well known stock-farmers is a fair average under present conditions.

By the use of exotic grasses, the acreage required per beast can, of course, be considerably reduced, but my figures tend to show that, at the present time, there must be some four million acres of privately-owned land lying idle—more than enough to satisfy all the present demand—with the probability of a still greater amount coming under that classification by the use of improved pasturage. The most important economic question before Natal at the present time is that of forcing this unused private land into the market.

* I am aware that of this 4,000,000 acres a considerable proportion consists of mountain slopes, bush, &c., but even making a liberal allowance for such land, there still remains an enormous quantity of land not fully utilised.

THE NATIVE QUESTION.

There are, dealing in round figures, just under 1,000,000 natives in the whole of Natal and Zululand, who are distributed, approximately, as follows:—

Zululand	220,000
Native locations and mission reserves in Natal . . .	275,000
Private lands	400,000
Crown lands	20,000

You will observe that there are 400,000 natives on private lands in Natal, as against 275,000 in native locations and mission reserves, and on Crown lands, *i.e.*, approximately speaking, there are four natives on private lands to 2½ in native locations.

From whatever point of view we regard the economic side of agriculture in Natal, we observe it influenced by the presence of the native population, and I know of no other self-governing British Colony where agriculture is so profoundly affected by a native population as in Natal. It is the disturbing economic factor, and the one which has to be, and must be, reckoned with and mastered before agriculture in this Colony can ever be placed upon a satisfactory basis. We are first of all affected by the mere presence of the native population. No matter whether these natives were the original inhabitants of Natal or whether they were driven out by Chaka, and returned and multiplied under the protection afforded by the white people, or whether they are all the progeny of Zulu refugees, the fact now is that they are here, and have been here for two or three generations. Writers on the subject of the native squatters on our farms frequently advocate our putting into force the old Squatters' Law, Ordinance No. 2, 1855, and, in favour of so doing, refer to the Orange River Colony, where the law is enforced limiting the number of squatters on any one farm. Such writers overlook the fact that the total area of the Orange River Colony is 50,000 square miles, with a native population of less than 250,000, against our area of 25,000 square miles, and total native population of, approximately, 700,000. The Orange River Colony is twice as large as Natal, but has only 4 natives to the square mile, against 30 to the square mile in our case, *i.e.*, excluding the locations. It is easy enough to shift natives when there is ample accommodation for them on the next farm; but, were we to adopt a policy of limiting the numbers of natives on any particular farm, they would be in the cruel position of Dickens' "Poor Joe," being constantly moved on without ever obtaining any information as to where they are to go beyond that of "On! on! on!" This you will see is another of our economic problems.

One of the consequences of the presence of the native tenant is the temptation to indulge in what is known locally as "katir farming"; and my fear is that too many have yielded to this temptation. Once a

man has bought by public auction a piece of Crown land on the twenty-year instalment system, the land to all intents and purposes becomes as truly his as if it were in freehold; and, from the date of his receiving his certificate of allotment, his power of obtaining rental from his native tenants is only limited by their ability to pay. It consequently happens that the most remunerative form of farming to the purchaser may be that of squeezing out of his native tenants as much rental as they are prepared to pay rather than flit. In justice to some so-called "kafir farmers," it must be pointed out that the position in actual practice is often this: A purchaser finds that natives are cultivating and running stock on the land which he has purchased and that they are unwilling to quit; to put the law in force and compel them to move will injuriously affect him as regards his labour supply; the natives express their willingness to pay him rental rather than leave; hail him as their father when he reluctantly decides he must let them remain; and, as he has to submit to the nuisance of their stock and their mealie gardens, he considers himself justified in making them pay what may seem a comparatively high rental. As the rentals received from the natives go a long way towards, if they do not actually meet, the amount of his annual instalment to the Government, it is only natural that the purchaser of the land should tend more and more to rely upon that income. The definition of a "kafir farmer," however, is only properly applicable to the man who deliberately lays himself out for native tenants and encourages as many as possible to dwell on his land, living on their rents and doing no genuine farming himself. The dealing with and checking of this kafir farming is a great economic problem.

To revert to one side of the question already mentioned, we are faced in this Colony with the presence of the native population, from whom we draw and must by force of circumstances continue to draw our agricultural labour, *i.e.*, our unskilled labour. I know of nothing in our climate, as compared with that of other portions of the world where European agricultural labourers have worked, to prevent European agriculturists themselves doing the whole of the manual labour; but it is obvious to anyone acquainted with Natal conditions that it is hopeless to expect European and native agriculturists to work side by side in our fields. It is not to be expected, and I must go further than that and state that it would be an economic waste for such a state of things to occur. Our natives are born agriculturists, and the province of the white man in Natal agriculture should be that of training, developing and supervising the excellent raw material of native labour. In brief, I consider it far more economically sound for the white farmer to spend his time in supervising one or more gangs of natives rather than for him to attempt to till his fields with his own hands. The native's aptitude as an agriculturist is that which proves the great drawback to his employment as an agricultural labourer on a white man's

produce can be sold on a large scale, the European can still hold his own. It must not be overlooked that "Sammy," in spite of his faults, is a very welcome visitor to many a housewife in town with his basket of vegetables, and does certainly at the present time fill a want.

MARKETS.

The Natal farmer is, generally speaking, fortunately situated in having his market close to his own door. For his staple crop of mealies, there is an enormous demand throughout South Africa, and the whole crop can usually be disposed of locally at remunerative prices. Natal is capable of producing far more mealies than it at present does, and, should the export of mealies to Europe turn out to be the success which is anticipated, the result will be not only that the farmer will be relieved of all anxiety as to where to dispose of his surplus crop, but that he will be induced to extend the acreage under mealies from year to year until every available inch of ground is utilised. The whole of our sugar crop is disposed of locally, and we shall be able to consume in our own markets (*i.e.*, within the Customs Union) the whole of the sugar that Natal will be able to produce for some years to come. The same happy condition of things applies to our Natal teas, provided always, of course, that we maintain a high standard, with the prospect of an over-sea market when we have more than provided for our own wants; but for neither sugar nor tea do we at present need to seek any export trade. Our wattle bark and our coal have made their reputation in the world, the trade in each is increasing yearly without any prospect of its being overdone for the present, and provided that our exporters ship nothing but good, honest stuff, our good reputation will be maintained. The whole of our wool can always be exported at remunerative prices; but there is room for great improvement in the packing and selecting of the wool, and one day, when the matter has been taken up by the growers themselves, we may hope to see an improvement in our methods with a corresponding improvement in prices and reputation. We can produce as good a tallow as can be obtained anywhere, but our growers sadly need education in their methods of preparation for the market. The Department of Agriculture recognises this and, with the co-operation of the growers, hopes to shortly effect a marked improvement. There is an almost unlimited scope for dairying in all its branches. Not only is there a vast amount of dairy products imported into the Customs Union, the whole of which ought to and could be produced locally, but it is a truism that dairying creates its own market and taste. We have first of all to catch up to and displace the imported article and then, by educating the taste of the public, to create an unlimited demand for our own dairy products. The native, who proves a disturbing economic factor in so many branches of agriculture, has again his adverse influence here. As before mentioned, he is a large buyer of cattle and, as he is by no means particular

as to the breed so long as he gets an animal of a passable appearance, those who cater for the kafir trade frankly own that it does not pay them to go in for better breeds or higher grades of cattle. Every animal they can rear can be disposed of to natives, who give no more for a high grade than for a low grade beast, or, conversely, will give as much for the one as the other.

DISEASES AND PESTS.

The conditions under which agriculture can be successfully carried on in Natal are largely determined by the diseases and pests with which we are afflicted. For instance, the prevalence of the disease known as horsesickness renders the general employment of horses for agricultural and transport purposes impracticable. The consequent utilisation of the ordinary ox-wagon perpetuates and spreads throughout the Colony from time to time such cattle diseases as Lungsickness, Rinderpest, and East Coast Fever. Were some effective remedy or treatment for Horsesickness discovered, our agricultural methods would be revolutionised, and the beneficial effects would be so far reaching that a new era of augmented prosperity would commence for Natal. The loss to the Colony from that disease is not only the actual value of the horses which die, but the prohibition of horse-breeding on any large scale, the time lost in transport, the spread of cattle disease by the transport ox and the wasteful methods of ploughing and harrowing with oxen. Horses not being available, if a small consignment has to be conveyed to or from a railway station, it does not merely involve as in other countries the harnessing up of a horse, occupying but a few minutes, and one man's time for an hour or two, but takes two or three kafirs an hour or two to catch and inspan the oxen, after which the clumsy vehicle wends its weary way to the station accompanied by the same two or three kafirs; and the whole day is occupied in the journey to and fro, in addition to the services of the 16 or 18 oxen, the kafirs, and the wear and tear of the wagon. A similar economic waste occurs in the process of ploughing or harrowing. In Europe or America it is a common sight to see the ploughman himself guiding and directing the two or four horses pulling his three-furrow plough. Here, the more common sight is to see one kafir guiding the plough, another voorlooping, a third plying the whip, and possibly a fourth walking by the side with a spade with which to clean the plough as it emerges from the furrow every now and again.

To show the effect produced by cattle diseases, I may instance the Rinderpest plague of 1896-97, which swept through the Colony and reduced the cattle of Europeans from 242,165 to 125,992, and the cattle of the natives from 494,402 to 114,829.

The economic results were various. On the one hand, directly the plague had died out, the surviving cattle increased so much in value that some farmers found themselves much better off than before. On the

other, so many sheep were sold to butchers on account of the scarcity of beef, and it became so much more profitable to breed cattle than sheep, that farmers neglected the sheep for the cattle industry, and our output of wool consequently declined. Just before the Rinderpest broke out (1895), there were 969,469 sheep in the Colony, and this number fell to 722,705 in 1897 for the reasons I have already mentioned. Another result was that frozen meat was then imported for the first time, and, the trade having once gained a footing, it has been difficult to dislodge it. Curiously enough, the presence of a still more deadly cattle disease, that known as East Coast Fever, bids fair to give the frozen meat trade its death blow. In Rinderpest days, fresh meat became scarce on account of the cattle dying so rapidly all over the Colony. The only hopes farmers have of saving their cattle, now that the East Coast Fever is with us, is—as an Irishman might say—to hand the animals over to the butcher for slaughter. Where this course of action is not followed and the disease is allowed to take its course, the mortality is enormous. The outbreak of the disease in a herd usually means its annihilation—the owner of the cattle is lucky if he saves three per cent. The mortality in the Colony since the first of January in this year has been at the rate of over 500 head a week, practically 15,000 cattle in the six months. Assuming the average value of these cattle all round to be £5 a head, then the loss to the farming community has been £75,000 in the six months, exclusive of the loss due to absence of ploughing and transport facilities. This disease of East Coast Fever will, while it exists in Natal, prejudicially affect the cattle breeding industry and the allied dairy industry, but directly it is stamped out, as I confidently believe it eventually will, those industries will again take enormous leaps forward. We have many of the fruit diseases and insect pests which trouble other countries, but, fortunately, have so far escaped some of the most devastating of those pests, such as the Codling Moth, etc. Locusts are a disturbing economic factor where young crops are concerned, but the arsenic method of destruction is now so well understood that the hoppers (which do the most damage), can easily be kept in check and destroyed. There is no practicable remedy against the flying swarms, although a natural fungus can be successfully cultivated and be used to help in lessening their numbers. Jackals are a serious menace to the sheep industry in the neighbourhood of the Berg, and the Government has now offered a reward for their destruction, which it is hoped will lead to their being hunted down. Tigers and wild cats are becoming more and more scarce each year, although they still occasionally appear and do a small amount of damage.

OTHER ECONOMIC FACTORS.

I have dealt with the more important economic factors affecting agriculture in Natal in what I deem to be the order of their importance,

and time does not permit of my doing more than briefly referring to others. Almost the whole of our farms are held in freehold and tenants are rather the exception than the rule; but every year tends to an increase of the latter class. Leases are more common in the Coast district and regions adjacent thereto than in any other portion of the Colony. The smallest holdings of which I am aware are those at New Germany, Marburg and Muden. The last-mentioned place has had a most successful record in irrigation. Tenants there have paid annually rentals of £1 and £2 an acre for small patches of irrigated land, and have succeeded in saving enough to buy small freehold farms. In New Germany there are 6 and 10 acre holdings, the lessees of which exist on proceeds of fruit and vegetables.

The Customs Union is specially favourable to the farming community, seeds being admitted free, and agricultural machinery apparatus, appliances and implements from the United Kingdom also coming in free of duty. As all our taxation is indirect, the farmer only contributes thereto on luxuries, such as wine, spirits, tobacco, and through the stamps and license duties. He has specially low rates over the railway system for his produce under the South African Produce Rate.

Natal, generally speaking, is a well watered country, and, though we have had what we have called several years of drought, we have never been so badly off as our Australian cousins, who would regard our very worst year of drought as but a very mild infliction compared with theirs. Our climate is a most ideal one, and, in fact, as healthy as can be found anywhere. Malaria is only a drawback in the northern and coastal portions of Zululand, and has never proved any serious trouble in Natal proper. Hailstorms are most vexatious visitations, wiping off in some twenty minutes or so the best results of a season and absolutely ruining the ripening crops; but, here again, as one well-known colonist informed me, though in certain localities they have always to be reckoned with, they usually give time to recover in between, and really bad storms do not, on the average, affect those localities more than once in five years. As we possess within the Colony different climates we shall, with organisation, be able to make ourselves self contained. For instance, by an interchange of seed between the Coast, Midlands and Uplands, we shall be able to obviate importation, keep money within the Colony, and at the same time by sympathetic selection to improve the seed. The average yield per acre of our crops on the ordinary virgin soil of the Colony is low as compared with other countries, but, by the use of manures, there seems to be no reason why our average should not rise from year to year. This, as a matter of fact, our statistics show to be happening. Sufficient time has not yet elapsed to show whether the Government Irrigation Settlements will prove a success. There is, however, sufficient evidence to show that, given the capital and the right class of men, there is no reason why they should not prove a success.

CONCLUSION.

In concluding this all too brief glance at the economic side of agriculture in Natal, I must say that the future prospects of agriculture being, as it should, the main source of wealth of the Colony, seem to me particularly rosy. We are but a young Colony, agriculture is practically still in its infancy, there are hundreds of thousands of acres awaiting tillage or development, we are still groping our way along experimenting in the search for crops specially suitable for Natal conditions and of economic value, each failure is in reality a step towards progress; and I feel confident that each year now will see us nearer that time when it will no longer pay owners of land to allow properties to remain practically idle, waiting for the unearned increment, and when Natal will rightly take its place as one of the exporting agricultural communities, instead of being, as it is at present somewhat contemptuously called, merely a Colony of samples.

A NEW FIBRE VENTURE.—A new venture for the exploitation of fibre is the Umzumbi Fibre Co., Ltd., which has lately been formed in Maritzburg. The capital is to be £10,000, in £1 shares; with a working capital of £5,000 and a reserve of £2,972, the balance of £2,028 being the amount to be paid, in shares, to the vendor of the two properties to be acquired, situated in Alexandra County—a part of the Colony that is apparently well suited to the cultivation of fibre. The directors of this new enterprise are Messrs. A. J. McGibbon, R. H. Cooper, and W. McLarty, M.L.A., with Mr. Allan Anderson as managing director, and Messrs. L. A. Menmuir & Co., 19, Timber Street, as secretaries.

ALCOHOL FROM CURRANTS.—A company has been formed in Greece for the production and exploitation of alcohol manufactured from currants, reports the U.S.A. Consul-General at Athens. The company has at present 100,000 tons of currants to work upon, resulting from the retention law, which does not allow the entire crop to be put on the market each year. This same retention adds to the stock on hand 6,000,000 Venetian pounds of dried currants each year. It is not probable, therefore, the Consul-General says, that the local demand for de-natured alcohol will ever outrun the production. It is more likely that Greece will be able to export de-natured alcohol in large quantities.

Sisal, Mauritius Hemp, and other "Aloe" Fibres.

By T. R. SIM, F.L.S., Conservator of Forests, Natal.

WHEN, six months ago, I left Natal for England in connection with the South African Products Exhibition, I received instructions from the Minister of Agriculture to make enquiries concerning the fibre industries which it might be possible to develop in Natal. This instruction was carried out, but in the meantime so much has appeared in the *Agricultural Journal* on the subject, and mostly sound information, that it is undesirable to repeat here all that has been ascertained, and I will confine myself to such additional information as has not been already given. In doing so I claim no expert knowledge in regard to machinery, but only state what I found, while in regard to the plants themselves and their culture, etc., I had all the kinds in cultivation thirty years ago which are now taking the leading place, and have grown most of them in South Africa more or less regularly though in small quantity since 1888, and can therefore claim some familiarity with them.

"ALOE FIBRES."

The term "Aloe fibre" is incorrect, inasmuch as the product is not produced by "*Aloes*" but by different species of *Agave* and *Furcraea*, though in a general way these resemble *Aloes* in habit and appearance; and one species of *Agave* is widely known in cultivation under the common name of *American Aloe*, though not a true *Aloe*. The term "Aloe fibre" is also vague, since it covers the product of many species, and of at least the two genera mentioned above, so it is advisable to drop it and use the more exact common names *Sisal Hemp* and *Mauritius Hemp*, though unfortunately these well-known and fully-established common names are also somewhat misleading since neither plant is related to *Hemp* except in that it produces a somewhat similar fibre.

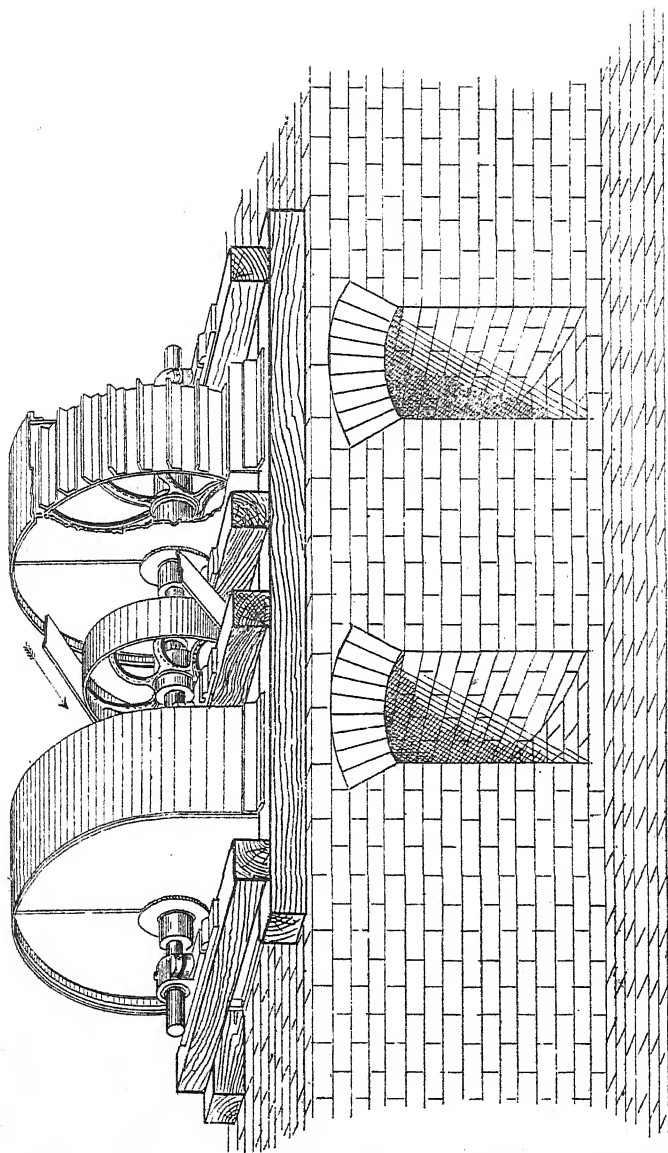
The botanical differences between these plants of somewhat similar habit is that *Aloe* belongs to the order *Liliaceae*, characterised by having the petals rising from the top of the ovary (seed-vessel), while *Agave* and *Furcraea* belong to the order *Amaryllideae* and have the petals rising from below the ovary. *Agave* has the stamens longer than the perianth (petals), and the style thread-like, while *Furcraea* has the stamens shorter than the perianth, and the style thickened below the middle.

The species of *Aloe* are not producers of fibre fit for economic purposes, but many species of *Agave* and *Furcraea* are so. Both *Agave* and *Furcraea* are represented by many species, mostly natives of Mexico and

the adjoining districts of North and Central America, as shown by the following figures from the *Index Kewensis*:—

	Agave. Species.	Furcraea. Species.
Mexico	124	5
Texas, California and Arizona	9	—
Central America	4	4
South America	4	3
West Indies	3	—
Malaysia	3	1
Madagascar	—	1
Horticultural hybrid	1	—
Doubtful	4	5
	<hr/> 152	<hr/> 18

Many of these species have never been seen in flower; some of them vary much in having within the same species forms with and others without thorns on the side of the leaf, or a spine at its point; all resemble one another in a general way and some of them do so very closely; all produce fibre, but they vary exceedingly in the quality and percentage of fibre; while even within any one species the percentage of fibre varies immensely in accordance with local surroundings. In Mexico and the West Indian Islands many species produce fibre which is sufficiently good to be a commercial commodity, and this is so much alike that it is shipped as one kind but of varying qualities in accordance with the preparation it has received. A few years ago it was doubtful which species yielded the valuable fibres, and which were not worth cultivation for fibre; even now few men know more than a few of the kinds, and the resemblance between good and comparatively useless kinds is so great and each varies so much in accordance with surroundings, soil and climate, that the risk is very considerable of getting hold of a wrong kind under the right name, and cultivating it for several years before the error is found out. For instance, Mr. I. G. Baker, in describing *A. decipiens*, which was found to form half the crop in some Florida plantations and was also introduced into the Bahamas as Sisal, remarks:—"The fibre which it yields is very inferior in tenacity to that of *A. sisalana*. I cannot make out any material difference between the flowers of the two species. The name *decipiens* refers to the plant being confused so easily with the forms of *A. rigida*, of which the fibre is so much more valuable that it would lead to loss and disappointment if it were cultivated for economic use." *Furcraea* as grown at Durban and Port Shepstone differs so much from that grown at Maritzburg as to lead to doubts about their being identical, while the latter resembles almost as closely the *Agave* grown in Durban under the name of Sisal Hemp, and to the casual observer might readily be passed as such. In India much con-



TWIN DRUM ALOE FIBRE SCRAPER.

As made by Les Forges et Fonderies de Maurice, Port Louis, Maurice,

fusion existed some time ago regarding the various species of *Agave* and *Furcraea*, as shown in Watt's "Dictionary of Economic Plants of India," *Agave Americana* even being at that time thought to be a contributor to the supply of fibre of this class.

AMERICAN ALOE.

What we know as "American Aloe" in South Africa, the hardy somewhat glaucous kind commonly used as a rough hedge, even in the upper districts, of which one or more variegated forms are in common cultivation as ornamental plants, is not yet botanically identified with certainty. It has usually been considered to be *A. Americana*, but recent investigations throw considerable doubt on *A. Americana* being so widely spread as supposed, and it is possibly *A. Vera-Cruz* or some other allied species. With this doubt as to its identity comes an equal doubt as to its fibre value. Some species in this group have valuable fibre, in others the fibre is comparatively worthless, and though about 30 years ago a factory for working this fibre was established at Grahamstown, the supply of leaves being obtained from the single lines of "American Aloes" used as hedges for miles around—that supply soon became exhausted and the industry succumbed without leaving on record what was the value of the fibre or the cost of growing and working it. It has a fibre, certainly, which suits an up-country native for cordage, but whether or not the plant is worth cultivation for its fibre may be said to have never been properly tried. It has a comparatively small number of leaves; these are difficult to work on account of weight and prickles and thickness, and probably a small percentage of fibre, but against this is the fact that it grows so freely all over South Africa and propagates so readily from suckers, though it does not form bulbils.

In the first volume of the "Imperial Institute Bulletin" are frequent and favourable references to Indian samples of what are called *A. Americana*, and American Aloe; but in regard to the Indian species it is noticed that recent authorities doubt the presence of *A. Americana*, though its viviparous nature also raises doubt as to its being identical with the South African kind. In one of these references it is stated: "The fibre of *A. Americana*, it may be mentioned, when made into ropes is stronger than Russian Hemp, and the paper manufactured from it is tougher than Bank of England notepaper."

SISAL HEMP.

The fibre product of Yucatan (which produces more fibre of this nature than all other countries together) is largely that of *Agave rigida* var. *sisalana*—or, as it is often written, *Agave sisalana*—and the name *Sisal Hemp* of commerce includes along with this the other *Agave* and *Furcraea* products of America and its islands. Various local names are in use, but to the commercial purchaser they are all merged, and he buys on the quality.

In Florida the true Sisal (*Agave sisalana*) is in cultivation along with several other kinds; in some of the West Indian Islands Sisal has been introduced and is cultivated to a considerable extent, in others local species are used, and it is now known that there are many species so used in these islands. Concerning German East Africa and the prospects of Natal, Prof. Dunstan, Director of the Imperial Institute, writes me:—

"The German authorities sent their officers to Mexico and Florida, and in 1893 a plantation was made, containing about 63,000 plants. In 1904 the plantations at Kikogwe and Muera extended to about 3,460 acres and contained nearly 2,000,000 plants. Plantations have also been established in other districts. In 1905 about 1,300 tons of fibre was exported, of the declared value of £50,000, which works out at an average of £38 10s. per ton. It is estimated that in a few years the Sisal Hemp produced will amount to 10,000 tons, and will represent a value of between £350,000 and £400,000 per annum. Extensive trials have been made in German East Africa of machines suitable for treating Sisal Hemp, and this problem appears to have been successfully solved. . . . My present impression is that Sisal Hemp will probably be the most profitable fibre in Natal. *Sansevieria* fetches a rather lower price and appears to present some difficulties in its preparation. *Furcraea* also is of inferior value to Sisal, and from what you told me I should say there should be no difficulty in producing Sisal in Natal of the same quality as that now so successfully turned out from East Africa."

In Natal there is at present very little of true Sisal Hemp. A good few years ago a small importation was received per post at the Botanic Gardens, Durban, and has been the parent supply of all now in the Colony except plants imported within the past two years. A further and larger quantity imported to the same Gardens as ship's cargo did not yield one plant. From the first consignment a number of suckers were sent to the late Mr. Watt at Port Shepstone, and were the parents of the comparatively small number now to be found in that neighbourhood. A few have been grown in the Durban Botanic Gardens and the stock kept up but not largely increased till recently, since there was previously no demand. There are meantime some of these with flowering poles, and these are producing flowers and seeds as well as a few bulbils. These are not the original plants but suckers from them. A good many plants have recently been imported, mostly by German Colonists here from their friends in German East Africa. Questions having recently been frequently put as to where supplies of young plants of sisal can be obtained from, I have received through the courtesy of Col. Prain, Director of the Royal Botanic Gardens, Kew, and also from the Director of the Imperial Institute, addresses in Florida, West Indies, and India, from which plants are likely to be obtained, which addresses I will supply on application. Advice has also been received from the Agent-General for Natal that Messrs. Vilmorin Andrieux et Cie, 4, Quai de la Megisserie, Paris, are in a position to supply these plants. They can supply, it is stated, at once 6,000 bulbils at £4 10s. per thousand delivered in London, or £5 2s. per thousand for quantities of less than 5,000. A communica-

tion on the subject has also been addressed by Government to the German East African Authorities, but up to the time of writing no reply has been received. Fibre cultivation is assuming large proportions in that country; and it should be possible to obtain from them a supply of young plants. Mexico is, of course, the first source of supply which suggests itself to most growers, but on this Col. Prain states:—

"The people of Mexico, I understand, are not unnaturally averse to the establishment of a Sisal industry in other lands, lest this should diminish their own profits. There are many other species of *Agave* in Mexico some of which especially when the plants are young, closely resemble Sisal, and yet yield but worthless fibre; the risk of being, either through carelessness or of set purpose, supplied with young plants that, when they grow up, prove not to be Sisal at all is so considerable that Mexico is to be avoided as a source of supply."

Col. Prain further adds:—

"I may mention that in India it has been found that the best distance to plant Sisal is at 5 feet by 5 feet. This gives 1,742 plants per acre. Therefore for 100 acres 175,000 plants will be required. An importation even for 100 acres is thus a formidable undertaking, and even if you decide to obtain young plants from all three sources (Florida, West Indies and India) I am doubtful whether from any of them you could obtain, at once, anything like 60,000 plants, which would be approximately one third the number required. When Sisal was imported by the Government of India, fifteen years ago, 5,000 was considered a large importation.

"Another important consideration is whether Sisal has been proved to thrive well in Natal. If this point has not yet been tested I think it would be well to do so before undertaking so wholesale an importation as is suggested above. I think that perhaps at first it would be well at the outside to import not more than 15,000 plants, viz ;—5,000 from Florida, 5,000 from the West Indies, and 5 000 from India, and to wait until the plants of the first importation reach the stage of poling: when sufficient young plants will be produced locally to supply the whole of Natal."

Professor Dunstan also gives a caution on this. He says:—

"There is no doubt that the fibre of *Agave rigida* var *sisalana* is superior to that of *Furcraea gigantea*. The latter fibre is finer and not so white, lustrous or strong as Sisal Hemp. The yield of Mauritius Hemp is about 2½ per cent. of the weight of the fresh leaves, whilst that of Sisal Hemp is usually about 4 per cent. Moreover, Sisal Hemp is generally quoted at a somewhat higher price (usually £3 to £4 per ton more) than Mauritius Hemp. Before replacing the *Furcraea*, which is already well established in Natal, by the Sisal Hemp plant, it would be desirable to ascertain by experiment the comparative suitability of the latter plant to the local conditions of soil and climate, and the comparative yield of leaves and fibre obtained from the two plants."

It can hardly be claimed that the behaviour or yield of Sisal Hemp is already well known in Natal. The *Furcraea* is widely distributed in Natal, and these particulars are known in regard to it; but in regard to Sisal the fact that it lives in a few localities is about as much as we know locally, and the fact should not be overlooked that in other countries and even in German East Africa certain localities are found to suit *Furcraea* better than Sisal and *vice versa*. In the Annual Report of the

U.S. Department of Agriculture for 1905 (page 146) it is stated in reference to Porto Rico, "There are considerable areas of dry rocky limestone soil very similar to that producing the best Sisal plants in Yucatan and the Bahamas." These climatic and soil conditions probably are worth attention in regard to Sisal.

The whole question seems to turn on whether the kind we have (*Furcraea*), and of which plants are easily and cheaply obtainable, is sufficiently good to go on with meantime until these points are cleared up, and until a large supply of Sisal can be raised locally, or obtained from East Africa or elsewhere on terms which are not prohibitive.

MAURITIUS HEMP (*FURCRAEA**).

The answer to this appears to be that it alone has been sufficiently good to make the fibre industry of Mauritius; that is, if our plant is identical with that grown in Mauritius. This has been questioned, and as the source of our supply is quite unknown it is just as likely to have been received from elsewhere as from Mauritius, and may be quite distinct though it is certainly closely allied. Neither seems so far to have been botanically determined with certainty. This is a botanical point which requires clearing up. But this fact at least remains that the sample bale sent to the S.A. Products Exhibition by the Natal Industrials, Ltd., from Port Shepstone, was reported on as follows by the Director, Imperial Institute:—

"The sample of Aloe fibre from Natal which was forwarded with your letter of March 9th, has now been examined at the Imperial Institute, with the following results:—

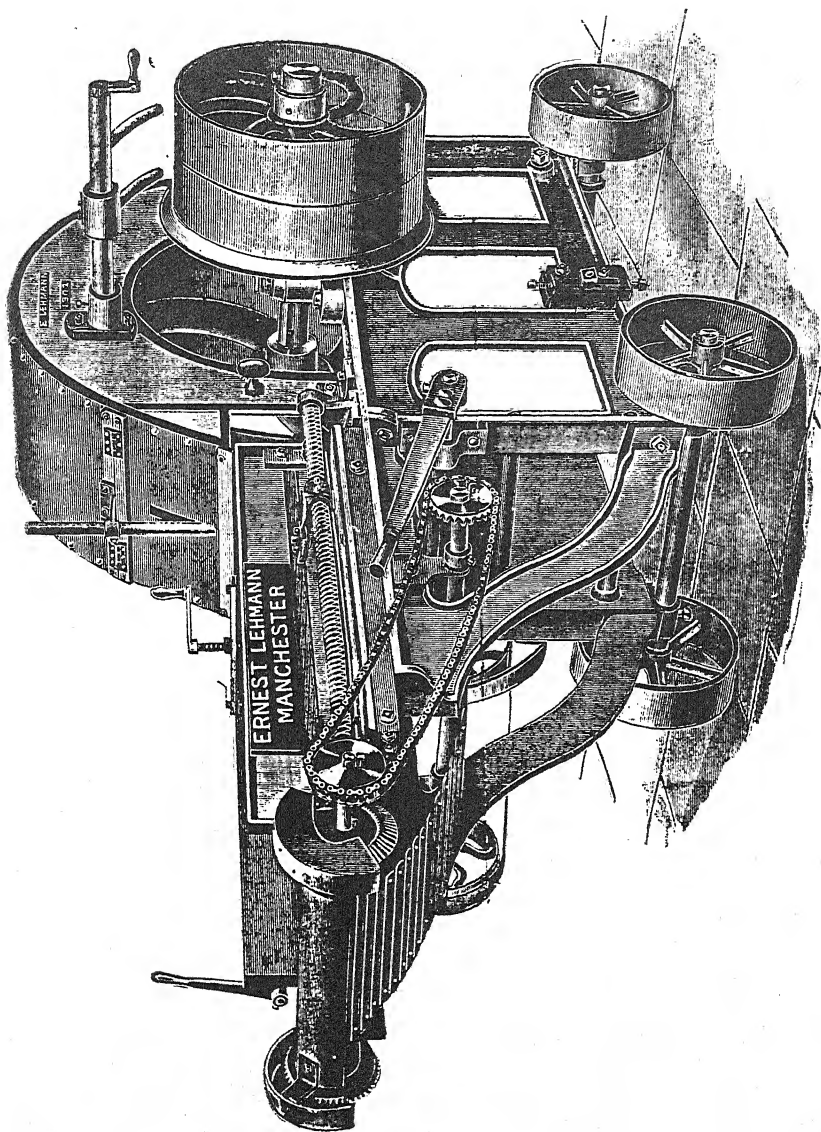
"The sample was labelled 'Aloe Fibre, Natal, Major Silburn, Port Shepstone,' and consisted of 5½ ounces of fairly lustrous white fibre, which was fairly well cleaned and prepared. It was of fair but rather uneven strength. The length of staple was 4 feet.

"Chemical examination of the fibre gave the following results:—

	per cent.
Moisture	9.3
Ash	0.9
a. Hydrolysis loss	12.7
b. Hydrolysis, los.	14.7
Acid Purification, loss	1.7
Cellulose	75.5

"The sample was submitted for commercial valuation to experts, who described it as corresponding fairly well with 'good, fair quality' Mauritius Hemp, and valued it at £26 10s. to £27 10s. per ton. At the time of this valuation Mauritius Hemp was quoted in the London Market at £25 to £30 per ton. The above results indicate that the fibre is of fairly good quality and very similar to other samples of *Furcraea gigantea* which have been examined at the Imperial Institute."

* *Fourcroya* is incorrect the earlier and therefore the correct spelling being as given above.



LEHMANN'S EXTRACTOR FOR ALOE FIBRE.

Rope made from the Port Shepstone fibre has also been in use in Johannesburg and most favourably reported on by the engineer using it.

In order to allow of comparison of above chemical examination the following particulars of other analyses of *Furcraea gigantea*, as recorded in the "Bulletin of the Imperial Institute," are given:—

Source.	Moisture. per cent.	Ash. per cent.	Cellulose. per cent.
South Australia	8.5	1.4	74.5
Southern India	9.9	—	77.7
Grenada	10.2	2.4	77.8
Victoria	11.6	2.3	72.2
British Central Africa	8.7	1.1	75.8
Natal (as above)	9.3	0.9	75.5

As the proportion of ash is very low, and that of cellulose equal to the average, it may be considered of good quality and likely to be durable.

Although we have meantime no report of Natal-grown Sisal (*Agave sisalana*), it is interesting to compare with the above *Furcraea* figures those given for Sisal from the same "Bulletin," viz.:—

Source.	Moisture. per cent.	Ash. per cent.	Cellulose. per cent.
South Australia	8.8	0.7	79.1
Bahamas	12.8	4.4	75.9
Trinidad	11.6	1.0	77.2
New South Wales	9.8	1.6	77.7
India (Saharanpur)	9.1	0.8	82.4

The above South Australian sample, which was a white strong fibre with a staple of average length, 40 inches, was considered of good quality as Sisal, and valued in 1904 at from £35 to £38 per ton.

It seems then that whatever the botanical name of our *Furcraea* may be, we have got in it a plant which is worth cultivation for its fibre, and of which a stock can easily be got up at once. If Sisal or any other species of *Agave* or *Furcraea* is afterwards found to be better, or better suited to our climate the change to it can be effected as stock is obtainable.

The fact is made a good deal of that Sisal fibre brings rather higher a price; that the percentage of fibre is higher in Sisal, and that its leaves can be fed directly into the raspador without the previous crushing or beating which the thick ends of *Furcraea* require. The difference in price for equal dressing is, however, very small; the percentage varies immensely in each species in accordance with the conditions of growth, and the size and thickness of *Furcraea* leaf also depends on the soil and climate. The advantage of the one over the other is not therefore such as to prohibit the *Furcraea* being profitable. On the other hand the earlier yield of leaves and the longer duration of life seem to favour the

Furcraea, and taking total production, percentage, and longevity and price into consideration, it seems to me likely that *Furcraea* will give the better returns here on reasonably good soil, though the *Agave* may do so on the lighter and more sandy soils. Neither can be expected to be a commercial success where any frost occurs, though both will live through a few degrees of frost; both suffer severely from fire, especially when young, if weeds among them are allowed to burn.

Both require land which is well drained, or in wet soil to be on the top of a bank and so free from stagnant moisture at the roots. The distance apart at which the plants are planted depends on the soil; the poorer and drier the soil the more plants per acre are required. In a recent article on Sisal culture in the Philippine Islands, where the usual espacement is 3 feet x 3 feet, the writer says:—"The Philippine planter, thinking to increase his crop, puts out three times as many plants to the acre as needed, and as a result gets less fibre per acre than if he spread the same number of plants over treble the amount of land." The same writer is very strong upon the injury done to the plants by commencing to harvest when the plants are immature, and also by cutting too large a proportion of the leaves off every year. Such undue harvesting weakens the plant, reduces the quantity and quality of fibre in future years and produces early poling. The treatment of Mauritius Hemp in Mauritius is given in the *Natal Agricultural Journal*, Dec., 1906, page 1,204, where 4 to 5 feet espacement is mentioned, but experience elsewhere, though mostly in other species, indicates the advantage of wider espacement, especially where mechanical cultivation is employed.

With such a heavy product as *Agave* or *Furcraea* leaves, which may run to 30 tons per annum per acre from mature crop, it is necessary when laying down a plantation to consider carefully how the transport is to be done, and to arrange accordingly. The use of an efficient tramway system may be said to be an absolute necessity, permanent along the mains, and with moveable sections as feeders. For the use of these the physical configuration of the estate must be studied, so as to arrange, even before planting, for leaving unplanted the contoured roadways which will be necessary several years later, and for securing with these the greatest service by the shortest route consistent with safety. The selection of the site for the mill must also be guided by this, together with the presence of water for power and washing.

The exports of *Furcraea* fibre from Mauritius in 1905 were:—

	Tons.
To the United Kingdom	1,217.2
To France	393.5
To Germany	27.3
To Belgium	8.4

1,646.4

In 1903 they were 1,491 tons, of the value of about £45,936 sterling. This fibre is not exported on a large scale from any other country.

SISAL PRODUCTION AND CULTURE.

Prof. Dunston remarks concerning the production and export of Sisal:—

"It is difficult to obtain trustworthy statistics with reference to the production and consumption of Sisal Hemp, but the following are probably fairly correct.

"In 1903, the following quantities were imported into the countries mentioned below :

	bales.
United States of America	575,167
Cuba	8,066
United Kingdom... ..	4 286
Canada	1,200
France, Spain, Germany and Belgium...	1,711

"The average output in Yucatan during the ten years ending December, 1901, was 416,328 bales, or about 74,000 tons (each bale weighing about 400 lbs.). In 1903 the production amounted to 590,430 bales (about 105,000 tons),* and in 1905 to 597,289 bales (about 106,660 tons).

"The amount produced in the Turks and Caicos Islands is small; in 1902 the quantity exported was about 223 tons, of value £7,100; in 1904 and 1905 the value of the exports was £6,886 and £5,803 respectively; nearly the whole quantity goes to the U.S.A.

"The Bahamas in the year 1902-03 exported about 1,047 tons, worth £37,524; in 1904 the exports were 990 tons, value £29,557; and in 1905, 1,357 tons, value £37,522. Small quantities are also exported from India. The production in German East Africa was mentioned in my letter of March 4th. (Quoted above.)

From the Philippines the export of fibre in 1901 was 875 tons, and in 1905 1,878 tons.

The cultivation of Sisal is also being taken up in New Guinea, the Toga Islands, Hawaii, etc.

Concerning the Sisal imported into India in 1892, and which was supplied by Messrs. Reasoner Bros., Oneco, Florida, the larger portion went to the Dauracherra Fibre Company, Cachar, which is now the largest fibre company in Assam.

From a summary of a report by Mr. F. G. Sly, the Acting Inspector-General of Agriculture in India, as recorded in the *Madras Mail* we learn:—

"The estate in question, on which about 1,000 acres are planted with Sisal, has a rainfall of 80 inches fairly well distributed, which is favourable to the continuous growth of vegetation; and Sisal, Mr. Sly says, as far as he could learn, has no prolonged period of rest. The soil on this estate is a fairly good loam, and by no means poor, being virgin land which was under a dense growth of mixed forest before it was reclaimed. Clay soils are unsuitable; shade is bad; and any water-logging is fatal. As regards the planting out of Sisal,

* Value £3,333,114 sterling. T.R.S.

so far from dumping in plants anywhere and anyhow on a wet day, as I have seen recommended, Mr. Sly prescribes the following careful treatment. The young plants should be at least one foot high and even longer, if possible. All weakly plants should be discarded. Pits should be dug about one foot deep and 1½ feet square. In the earlier years the plants in Assam were set out too far apart; the most economical distance is now said to be 9 ft. \times 4½ ft. \times 4½ ft., i.e., two rows 4½ feet apart, with 4½ feet between the plants in the row, and then a space of 9 feet for convenience in cropping the leaves."

In view of the comparatively heavy rainfall mentioned above it may be necessary to reassure Natal planters by stating that where the Sisal is cultivated in Yucatan the rainfall is very low, and Mr. T. W. Wells, a Queensland grower of Sisal, remarks in a pamphlet on the subject:—

"Though excessive rains, no doubt, are not beneficial to Sisal, except to make it grow faster, they are not very injurious if the land is naturally drained; but Sisal does not like wet and waterlogged ground. . . . It is the fair to good lands, especially those of limestone origin, situated in dry districts, to which we should, I think, turn our attention for Sisal-growing."

In regard to a series of samples of fibre sent from India and grown at Madras, Bangalore and Chickmagalur (i.e., at sea-level and at 3,000 and 4,000 feet above sea-level respectively), the following particulars are given in the "Bulletin of the Imperial Institute," taking the standard of the strongest as 100, though it must be noted concerning the values that as the samples were from different places and not equally prepared, the valuation may have been affected by that:—

Sample.	Comparative Strength.	Approximate Value in London. Per ton.
No. 4 Agave sisalana	100.0	£31 to £32
No. 3. Agave sisalana	87.5	£29 to £30
No. 6. Furcraea gigantea (badly prepared)	81.0	£23 to £24
No. 2. Agave Vera-Cruz (badly prepared)	62.7	£22 to £22 10s.
No. 5. Agave Wightii (short fibre) . . .	57.9	£22 to £23
No. 1. Agave Vera-Cruz (badly prepared)	55.3	£24 to £25
But if well prepared		£26 to £28

The species named *A. Vera-Cruz* above is similar if not identical with what we call the American Aloe, but as the synonymy of both *Agave* and *Furcraea* is desperately and almost inextricably mixed, and as several almost similar species of the Americana group are widely different in their fibre values it is not safe to assume that the above figures indicate either the comparative strength or comparative value of our American Aloe.

But it is common experience that any difference in the preparation of the fibre affects its value, and in this respect one sample sent to the S.A. Products Exhibition with a green colour was found to be considered unfit for market though of fair length and cleanness in other respects.

In order to secure better colour the following advice is given by the *Queensland Agricultural Journal*:—

"When the Agave leaves are passing through the machine, a slight stream of water should play on them as they pass under the beater bars. On leaving the machine the fibre will have a slightly green tinge, which passes away when the material is hung up in the sun for a couple of hours. It will then appear white and lustrous, but there will still be a certain quantity of gummy matter adhering to the fibres. This can be easily got rid of by washing the fibre for a few minutes after it leaves the machine. All imperfectly cleaned fibre, having still some of the green cuticle or flesh of the leaf attached to it, should be kept separate."

MACHINERY NECESSARY.

The extraction of the fibre from any of the kinds already mentioned is not of itself a difficult matter, but still the method of harvesting and extraction generally rules whether a planter will have profit or loss in the business.

The old Mexican method which is still in use in some places is simply a knife fixed at one end and a block of wood; between these the fibre is drawn by hand, and the process is repeated and more pressure applied to the free end of the scraper till the scraping is considered complete.

The next improvement on this is what is known as a *Raspador* in Mexico and as a *Gratte* in Mauritius, the principle in each case being a rapidly revolving drum on which cross-bars are fixed at such distances that when the leaf is pressed under this the cross-bars scrape off the green flesh of the leaf leaving the fibre more or less clean. These machines are usually encased so as to prevent the acrid juice being thrown on to the workmen.

Numerous improvements on these *Raspadors* have been made, but the principle of all continues to be almost the same, and with the exceedingly cheap labour of Yucatan an enormous amount of fibre still continues to be extracted by this means.

But the Mexican plant being mostly *Sisal*, while ours is mostly *Furcraea* at present, it is better to follow the Mauritian method, where also *Furcraea* is used, and where, on account of the thickened lower portion of the leaf it is found necessary to use a beater to bring that into form before feeding the leaves to the gratte. In reply to my enquiry I have the following information from the firm who were recommended to me by the Director of Forests and Gardens in Mauritius, viz., Forges and Fonderies de Maurice, Port Louis, Mauritius:—

"In reply to yours of 10th January, we have pleasure in enclosing herewith two blue prints, one showing a pair of scrapers such as are exclusively used by manufacturers here in the preparation of Aloe fibre. The print* shows one scraper enclosed in its wrought iron sheet guard, and the other with the guard partly broken away to show the scraper blades fixed to the drum. The driving pulley lies between the scrapers and serves to drive both. In this

arrangement it will be seen that the output of fibre may be increased as may be desired, by the addition of other pairs of scrapers without in any way retarding the working of such as already may have been installed. The view shows the back of the scrapers with outlet doorways in the brick foundation for the removal of all waste products, pulp, water, etc. In the front of the machine are arranged two feeding tables upon which the aloë leaves are fed into the scrapers. The beater is of similar design to the scraper, but with fewer blades and different arrangement of feeding. It has been found here that with an installation of four scrapers and two beaters about a ton of aloë fibre can be prepared in one day of 11 hours."

And they append the following quotation f.o.b., Mauritius Harbour:

	£	s.	d.
One pair scrapers, with shaft, pulley and plummer blocks	45	15	0
One beater for ditto	26	16	0
One twin-screw baling press	62	2	0
	£134	13	0
2½-inch turned shafting, per foot	0	5	4
Coupling boxes for ditto, each	1	12	9
2½-inch plummer blocks each	1	16	0
39 inch pulleys, each	3	12	0

It has already been mentioned (*Natal Agricultural Journal*, December, 1906, p. 1,205) that for the African coast, where the Aloë plant reaches much greater sizes than in Mauritius, special machinery has to be provided for, and orders can be sent accordingly.

Most, if not all, of the Aloë fibre machines in the market require steam or other gear, but mechanical ingenuity has been much exercised in the direction of producing a machine which will clean a large amount of fibre with only a small number of men in attendance and thereby reduce the cost of cleaning. Year by year fresh machines claiming to be improvements in this respect and also in simplicity, are put upon the market, and since the companies and planters now putting down fibre plantations will not be in want of machinery for three years at least, there seems little practical benefit meantime in reviewing the machines in use, further than to allow planters to have an idea what the extraction costs, and so form an estimate of prospective profit.

Leaving out the cost of power the Mauritius outfit of four scrapers already mentioned would cost about £200, and treat the produce of say 250 acres. On the Dauracherra Estate (India) already mentioned the machine is a Torroella costing about £600 there, and expected to deal with 600 to 800 acres of Sisal.

Mr. C. Rositzky, Port Shepstone, who is agent for several machines, shows the cost and capacity of a Single Raspador, a Double Raspador, and a Matador in the March number of this *Journal*, page 214. The latter is one of the large machines fitted for a large estate. The Double Raspador is illustrated at page 370. The "La Corona" illustrated at

page 379, and for which also he is agent, is made by Hubert Boecken and Co., Duren, Rheinland, Germany, and offered by the factory for £400, and said to clean 12,000 Sisal leaves per hour at lowest speed. This machine is in use in the Bahamas, German East Africa, and elsewhere, and is highly spoken of. Extractor No. A. illustrated herewith, made by Mr. E. Lehmann, of Manchester, is stated to weigh 21 cwt., to require 2 h-p. and to produce about 750 lbs. of fibre per 12 working hours. Cost £65, or on wheels £75. He also makes a hand power machine at £35.

Mr. T. Barraclough, 20, Bucklesbury, London, E.C., makes several machines from about £30 up to £400, which latter is his "Special" Fibre Extracting Machine, and is calculated by him to be able to produce 3,150 lbs. of dry fibre per day.

Messrs. Death & Ellwood, Leicester, produce a small hand-power machine at £45 and a larger machine at £60, and one still larger. The Todd machine, largely used in the Bahamas, costing, with steam engine and steam press, about £1,000, is made by Mr. T. C. Todd, of Patterson, New Jersey, U.S.A., the leaves enter the machine sideways, and it is claimed to turn out 1,500 lbs. of fibre in a day. Mr. A. C. Harris, Leicester, supplies a machine, and Mr. M. F. Fasio, 56, Rue d'Isly, Algiers, is manufacturer of "La Portative" for hand or steam power.

The following machines are stated by the *Queensland Agricultural Journal* to be in actual use in Yucatan:—

Machine.	Number of leaves cleaned in 10 hours.	Actual horse power.	Number of men needed.	Cost. £	Number in use.
Lanaux	130,000	35	3	571	6
Prieto	125,000	60	3	664	90
Stephens	150,000	70	3	1,047	6
Solis (Raspador) ..	9,000	6	2	24	1,200
Torroella	80,000	30	3	476	20
Villamor	70,000	35	3	571	?
Death & Ellwood ..	20,000	3½	2	130	?

From the above it will be seen that there are machines in the market to suit all sizes of estate and pocket. But it is usually claimed that the larger machines save labour enormously. It seems to me that on an estate large enough to require a resident engineer that may be the case, but that on smaller estates the chances of breakage and consequent delay and cost of repairs make the simplest machines claimed the most economical, and allow for the extra boys required. It is also claimed that some machines give a higher percentage of good fibre than others, i.e., they destroy less and consequently produce less waste of fibre. As this can hardly be proved except by machines working side by side on fibre produced on one part of one estate only, the statements in regard to this should be received with caution, except an evident and undue waste occurs.

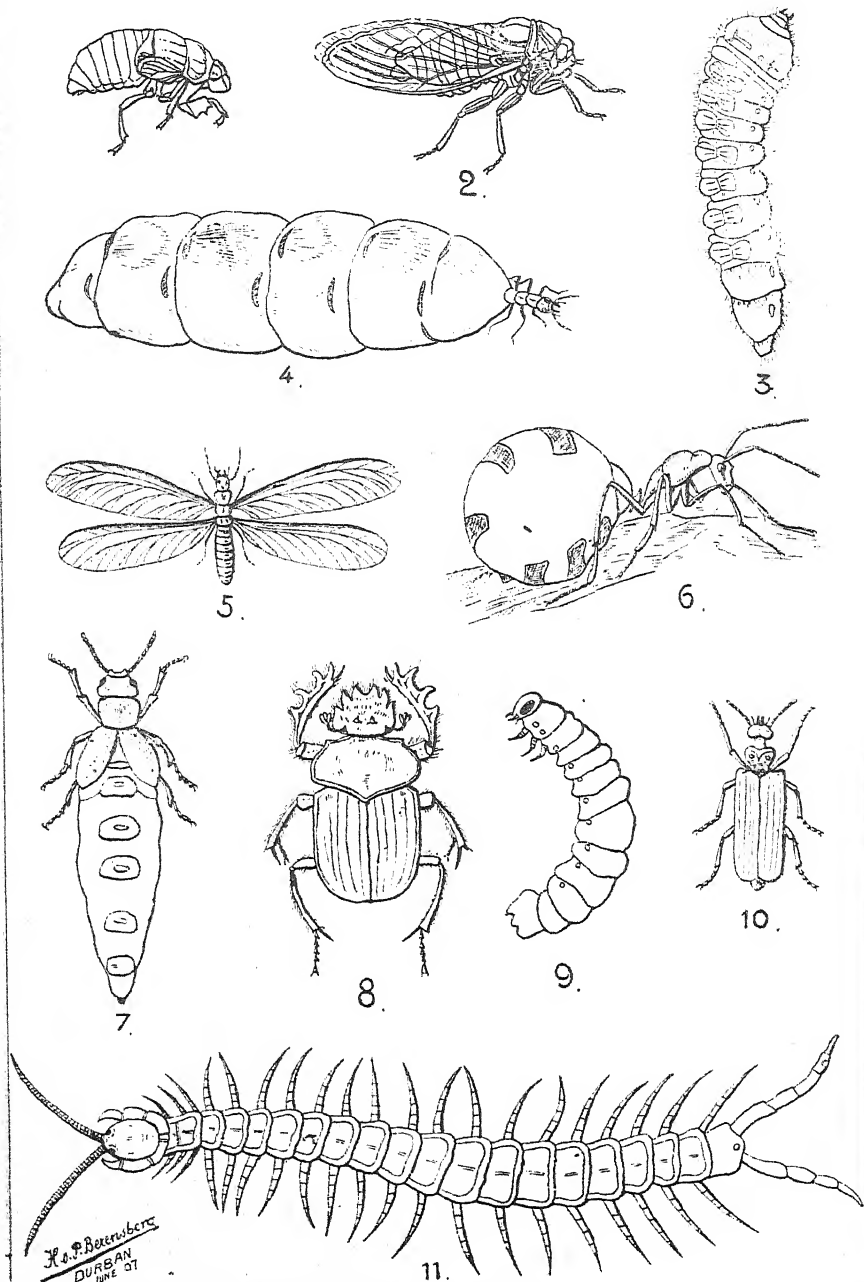
Taking the fibre industry as a whole there appears to be every prospect that it will prove a valuable asset to Natal, and to those who carry it on. If systematically and economically worked with the right kinds success is assured, but the most important point at the present juncture is to see that the best kinds, and these only, are used.

Wattle-growers know the difference in profits yielded by Silver Wattle and Black Wattle respectively, and still neither the analysis nor the rate of growth gave early planters an indication that there was much difference. So also the Golden Wattle with its higher percentage of tannin is found less suitable to Natal than the Black Wattle.

That there is a decided difference between the yield and value of fibre produced by different but very similar *Agave* and *Furcraea* kinds is well known, and the first duty of the planter is to make sure he has the right kind, and then plant so as to suit economical harvesting, leaving machinery out of close consideration until he is ready to use it.

In matters concerning the United States National Government, milk, in order to be designated "standard," has to conform to the following definition proclaimed by the Secretary of Agriculture:—"Milk is the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and ten days after calving, and contains not less than eight and one-half (8.5) per cent. of solids—not fat—and not less than three and one-quarter (3.25) per cent. of milk fat." In Great Britain, milk, to be considered unadulterated, must contain 3.5 per cent. of milk fat, and 8.5 per cent. of solid matter other than fat.

The dairy factories in certain States of America do an enormous amount of work, remarks the *Live Stock Journal*. During the year 1900 there were 9,245 of these factories in operation in the two States of New York and Wisconsin; they produced 440 million lb. of butter, 280 million lb. of cheese, 18 million lb. of dried casein, practically all condensed from skim milk, and 187 million lb. of condensed milk. They also sold 8½ million gallons of cream. The total value of these products is put at £26,000,000 sterling. New York and Wisconsin States aggregate 67 million acres, and they fed between them in the year mentioned 2,395,000 milking cows, the average value of which in the former State was £6 14s. per head and in the latter about £6 6s.



H. J. Berensberg
DURBAN
June 07

EXPLANATION OF PLATE.

1 LARVA OF CICADA	4 TERMITE QUEEN	7 MELOË (OIL BEETLE)	10 SPANISH FLY
2 IMAGO "	5. " (WINGED)	8. SCARABAEUS SACER	11. CENTIPEDE
3 LARVA OF PRIONID BEETLE	6. HONEY-POT-ANT	9 LARVA OF PASSALID BEETLE	All figures nat. size, except 11, which is much reduced.

Uses of Insects as Food, Delicacies, Medicines, or in Manufactures.

By H. VON P. BERENBERG.

INSECTS are considered by most men as a nuisance, by farmers and gardeners as pests. This is often only too true, but there are a great number which are directly beneficial in destroying other injurious insects or in fertilizing the flowers of fruit trees and crops. The category which will be treated of in this article contains injurious as well as beneficial insects, and it will be shown how mankind has profited by the use of them as food or in various industries.

One of our greatest pests in South Africa is the locust; but at the same time locusts have been used as food in nearly every part of the world where they occur. In the Bible it is mentioned that the Israelites during the passage through the desert after having left Egypt lived sometimes on locusts. Later on we hear that John the Baptist retired to the desert and lived for months on locusts and honey of wild bees. But earlier, Strabo, the well-known geographer, recounts that the Parthians are called *aceridophages*, or locust-eaters. Diodorus Siculus, a contemporary of Julius Caesar, gave the same name to a tribe of negroes who lived on the borders of the Sahara, and who were supposed to have no other food than these insects. In both cases it will be right to consider *Pachytylus migratorius* as the one mentioned. In South Africa this locust is replaced by *Gryllus devastator*, or, giving its earlier name, *Cyrtacanthacris septemfasciata* (Serv.)

The natives of South Africa consider the locusts a very welcome food, and eat them roasted or dried; the Hottentots and Bushmen welcome the arrival of a swarm, which gives variety to their menu, which, in the arid districts of South-West Africa, is rather a simple one. They prepare also a fat brown soup of the eggs. Bedouins, Moors, and also the economical-minded Chinese, who waste nothing in the way of food, prepare various dishes out of the locust, eating them raw, cooked, roasted, ground and baked into pastry. Jackson, in the record of his travels in Barbary in 1799, mentions dishes of locusts as being generally served up at the principal tables and esteemed a great delicacy. A pastry which is much valued by Europeans in Algeria is prepared in the following way: The locusts, after having been cleaned of wings and legs, are cut into pieces an inch long and left to soak in rum for a few days. They are then baked in the form of a pie. Sugar is strewn over the dish; a small hole is made in the top, and a quantity of Burgundy wine is

added to the contents. But it seems more probable that the alcoholic ingredients of this pastry have more to do with the popularity of the dish than the locusts.

Cicadas (see plate) were kept by the Ancient Greeks in small cages on account of their song, but Aristotle mentions that they were also eaten. He tells us that the males were the finest at first, but afterwards the impregnated females; and that some gourmets preferred the larvae just before the skin burst. The Indians of America still boil the larvae of *Cicada septemdecim* (this larva remains seventeen years as such—hence the name).

Among the ancient Romans the larva of a certain beetle found in oak trees was never lacking on the tables of the nobility. Probably this was the larva of the "Flying stack" (*Lucanus cervus*) or of *Prionus coriarius*, a longicorn beetle. The larva was about 3 to 4 inches long; and before serving was fattened for several days on the best flour.

The larvae of *Prionus damicornis*, which attain the thickness of a man's finger, are eaten in Surinam, in America, and in the West Indies, both by whites and blacks, who empty, wash, and roast them. The larva of the giant clickbeetle, *Tetralobus flabellicornis*, is esteemed a delicacy by the negroes of Central Africa; as the larva of *Malodon Downesii*, a South African longicorn, by the kafir; the larva of the palm-borer, a curculoid of 2 inches in length, by the natives of Madagascar and India; and several larvae of *Passalidae* (see plate) and *Prionidae* (see plate) by the natives of India and Surinam.

Of the Lepidopterous tribe, the fat caterpillars of *Gynanisa maia*, *Nudaurelia belina* and *Bunaea caffra* (all of the Saturnid moths) are emptied, stuck on small sticks, and roasted over the fire by the natives of Natal. Sparrman counts those caterpillars from which butterflies proceed amongst the delicacies of a Bushman's table.

Chinese and allied races eat the pupae of the silkworm after the silk has been unwound, and have many ways of preparing them. Neither do they despise the larva of a hawkmoth, some of which tribe Darwin tells us are very delicious.

Prof. Carl Lumholz, in his book on Mexico, figures a group of Indians engaged in extricating the caterpillars of *Eucheira socialis*, Westw. (a moth) from the silken tents woven together by the larvae. These are a staple article of diet among some of the mountain tribes; and the forests are literally white with the silken webs. Another lepidopterous insect which is used as food is the "Bugong moth" (*Euxoa porphyricollis*) which is collected by the bushel by the natives of New Holland and baked by placing them on the heated ground. It may be interesting to quote here a passage in "Bennett's Wanderings":—"The Bugong moths collect on the surfaces and also in the crevices of the masses of granite in incredible quantities. To procure them with greater facility, the natives make smothered

fires underneath those rocks about which they are collected, and suffocate them with smoke, at the same time sweeping them off frequently in bushels-full at a time. After they have collected a large quantity, they proceed to prepare them, which is done in the following manner:—A circular space is cleared upon the ground of a size proportioned to the number of insects to be prepared; on it a fire is lighted and kept burning until the ground is considered to be sufficiently heated, when, the fire being removed, and the ashes cleared away, the moths are placed upon the heated ground, and stirred about until the down and the wings are removed from them; they are then placed on pieces of bark and winnowed to separate the dust and wings mixed with the bodies; they are then eaten or placed in a wooden vessel called a 'walbun,' or 'culibun,' and pounded by a piece of wood into masses or cakes resembling lumps of fat, which may be compared in colour and consistence to dough made from smutty wheat mixed with fat. The bodies of the moths are large and filled with a yellowish oil, resembling in taste a sweet nut. These masses will not keep for a week, and seldom for that time; but by smoking they are able to preserve them for a much longer period. The first time this diet is used by the native tribes, violent vomiting and other debilitating effects are produced; but after a few days they become accustomed to its use, and then thrive and fatten exceedingly on it."

Termites, or white ants, afford an abundant supply of food to some of the African races. The Hottentots eat them boiled and raw, as also do some of the Central African tribes. The Indians in Natal collect the flying insects and devour them after having removed the wings. The natives in some parts of the East Indies make two holes in an ant-heap and drive the termites out by smoke from strong-smelling materials. Anderson, in his journey to Lake Ngami, mentions the same proceeding of the natives near the Lake. In this way thousands of insects are captured and a paste made of them. Sometimes some flour is added. The female ant or queen, in particular, is supposed by the Hindus to be very nutritive.

Honey, as a product of the bee, is eaten everywhere throughout the world, but it may perhaps not be generally known that the honeycombs full of young and old larvae are also eaten by African tribes, and that they are preferred to the pure honey. The natives of Ceylon do the same. An intoxicating drink is made by putting water on the combs and afterwards fermenting it. True ants serve often as food, so Piso tells us with reference to a yellow ant, called *Cupia*, which inhabits Mexico. He further mentions a larger ant called "Tama-joura." A very curious member of this family is the honey-pot ant, *Myrmecocystus mexicanus* (see plate), of which the workers serve as food-reservoirs. These are fed by the individuals of the same heap with all the sweets, juices of aphides, etc., which they gather in their abdomen, this latter attaining a considerable thickness like a small walnut. These living

"honeypots," as they are called, are sold by measure on the markets in Mexico. The inhabitants prepare an intoxicant of these ants by crushing them in a mortar, passing the liquid through a strainer and fermenting it in a suitable place. The taste of ants is agreeably acid. In Sweden they are distilled with rye to give a flavour to an inferior gin.

Several products of gallflies are also consumed, the taste being very much like that of a juicy apple. The larva of *Tyrophaga Casei*, a fly which lives in cheese, is not the only one of the dipterous family which is eaten—a dainty some think it, particularly in the Limbourg cheese. When Livingstone and his party visited Lake Nyassa, they were attacked in certain seasons by great swarms of small gnats, which sometimes became so abundant that clothes and body were completely covered with them, they congregated inch thick on the bottom of the boats, and were captured by the natives and boiled and afterwards baked into cakes about one inch thick of a dark brown colour and of a taste like caviare.

Some rather obnoxious insects, such as are found on the head and in clothes, are not without their admirers. Many tribes on the West Coast of Africa, and the natives of Annam and Tonkin, consider them a delicacy. The Eskimos have a special preference for these little animals. In a volume of travels in Polar regions which I have read, there is a passage relating to this habit which is remarkable. A woman complained about her husband, "that he was too clean and that she never could find any delicacies on his capital pasture."

Spiders even have found their lovers. Labillardiere tells us that the inhabitants of New Caledonia eat large quantities of a spider nearly an inch long, which they roast over the fire. But even individuals amongst the more civilised nations of Europe have a similar taste. Reaumur tells of a young lady who cracked every spider upon the spot where she found it. Anna Maria Schuurman ate them like nuts, and Lalande, the celebrated French astronomer, was very fond of these delicacies. Roesel tells of a German who used to spread them on his bread like butter. These edible *Aptera* and *Arachnida* are sufficiently disgusting, but when Humboldt mentions that he has seen Indian children drag out of the earth centipedes (see plate) eighteen inches long and more than an inch wide, and devour them with avidity, then our nausea may give place to horror.

The first cause that led human beings to take to insects as food may have been utter starvation. This was doubtless the case in South-West Africa, where water is scarce and the soil yields very poor products, and in some parts none at all. The starved creatures were thus compelled to seek sustenance in the form of the insects they came across, and subsequently became fond of this form of nourishment as affording a change in their daily menu.

A century ago a great number of insects were used in medical

science; of these some had a little medicinal value, others none at all, and others again were positively dangerous. As instances, the following may be noted, which were used:—The woodlouse as a solvent and aperient; powder of silkworms against vertigo and convulsions; millipedes against jaundice; earwigs against nervousness; powdered scorpion for the stone and gravel; fly water for disorders in the eyes; and the tick for erysipelas. Fire gnats were used as a purge; wasps as diuretics; ladybirds against colic and measles; the cockchafer against rabies and plague; ants and their acids as incomparable against leprosy and deafness as for strengthening the memory and giving vigour and animation to the whole bodily frame. Ants still play a role in modern medicine, put in spirits and used against rheumatism.

The Holy Scarabæus (*Scarabæus sacer*), an inhabitant of the countries along the borders of the Mediterranean, well known by its habit of making pills of animal dung, was said by Plinius to be a remedy against malaria when carried fixed to the naked body. The Fellahin still use this beetle, deprived of its head, elytra, and other hard parts, soaked in sweet oil, as a remedy against deafness. They place it in the affected ear, where it is left several days and pushed out by heavy breathing with closed mouth and nose. Few insects are nowadays used as remedies, but these amply make up in efficacy for their numerical insignificance. One of the most effective families is the one of *Cantharididae*, which was already known to Hippocrates, the celebrated doctor of antiquity. These beetles, of which more than 800 species exist, contain a powerful vesicatory. This being very poisonous, great care has to be exercised in not taking too big a quantity in preparing tinctures, plasters, pills, and ointments. This poison is called cantharidin, and the most effective is found in the Spanish fly (*Lytta vesicatoria* (see plate), a beautiful green beetle about $\frac{3}{4}$ to 1 inch long and occurring in the South of Europe. It possesses a characteristic strong smell. There are other beetles of the same family which have the same vesicatory qualities but in a lesser degree, to which belong the *Mylabris*, or blister-beetles, very common in South Africa and the *Meloeid*, or oil-beetles (see plate). The "aqua tofana" of ill-fame, a poisonous drink, which caused the death of many hundreds of people at Naples at the end of the 17th century, is said to have been a decoction of cantharidin and spirits of wine. Lastly may be considered an insect which does not serve as a remedy but more as a "beautifier," and is used to tint tooth powder, tinctures, etc. This is the cochineal louse (*Cocci cactus*), which is the most valuable member of a great family, the *Coccidae*. It measures only a few lines and came originally from Mexico, where it lives on the fig-cactus (*Opuntia coccinellifera*), but has spread now over a great part of the world; it is found also on the "prickly pear" in Natal. The females are dried on hot iron plates and powdered. When dissolved in hot water they give a beautiful

carmine dye, which is used largely in the dyeing industry. Two other allied species are the *Chermes* (*Lecanium ilicis*), which lives on the Chermes oak (*Quercus coccifera*) in the south of Europe, and imparts a blood-red or crimson dye to cloth, and was already known to the Phoenicians; and the lac scale (*Coccus lacca*) from the East Indies, which furnishes the product known under the name of shellac. Some aphides also afford dyes as crimson, orange, and yellow.

Wax as a rule is produced by bees, but there are many other insects which deliver us this material. In China wax is produced by a species of coccus (*Ericorus pela*), the male larva of which forms a cocoon which is covered by filaments like fine soft white wool and which are secreted by the pores of the body. The Province of Szetschuan produces every year about 200,000 dollars' worth of this wax, which is worked into candles, and also into images for temples and other objects. Many aphides and cocci secrete a wax-like material, which is called white lac, and is cheaper than beeswax. In Natal a wax insect is found on the wild fig and on some thorny bushes, which boiled produces the material of which the native indunas make their head rings, which are of a brilliant black.

There is no other insect to which science is so much indebted as to the little gallfly, which produces the gallnuts from which ink is made. These galls originate on the leaves of an oak (*Quercus infectoria*), very common through Asia Minor. The blue galls, being the produce of the first gathering before the fly has emerged, are better than the white galls from which the insects have already emerged and which have lost the astringent principle.

Now remains to be considered the most valuable product of insects, namely, silk. Unrivalled for its richness, lustre and beauty, it is a staple article of cultivation in many large provinces of the south of Europe, not to speak of Japan and China; and is one of the most important wheels that give circulation to national wealth. Silk-worms have been reared from time immemorial, being mentioned in the oldest Sanscrit books as one of the chief objects of cultivation and manufacture. It seems that silk was first manufactured in Asia in a country called Sericum. In Europe the mode of producing and manufacturing this precious material became known about the year 530. Two monks procured the eggs of the silkworm moth (*Bombyx mori*) in India, and, concealing them in hollow canes, brought them to Constantinople. From there the silkworms were introduced into Italy, and also, in the reign of Henry the Fourth, into France. Besides the common silkworm, other species are found in India, which are employed in sericulture. Of these the most important are the "Tussoc" and the "Drindy" silkworms.

There are many other products obtained from insects, but the foregoing may be considered sufficient to show the benefit man derives from these little creatures so often despised by unthinking people.

An Indigenous Fibre Plant.

GOMPHOCARPUS PHYSOCARPUS.

THERE are thirty-one known species of *Gomphocarpus* indigenous to Natal, but of this number there are probably only two which are at all likely to be of any economic value as fibre plants, viz., *G. fruticosus*, R.Br. and *G. physocarpus*, E.M. Recently a correspondent sent a sample of fibre from the latter plant, together with a specimen of the plant itself, to this Department with a request for a report upon its commercial value. The Annual Report for 1888 of Mr. J. Medley Wood, Director of the Botanic Gardens, Durban, contained some interesting particulars regarding some samples of fibre that had been submitted to experts in England. Mr. Medley Wood wrote:—

“The fibre from this plant (*Gomphocarpus physocarpus*) has been frequently sent to me, and many years ago I myself prepared specimens for exhibition. In the early part of the year I received two samples, one from Mr. John Dunn, of Zululand, and one from Mr. Plaxton Harrison, of Durban, the last one prepared by a new process. These samples were forwarded to England for report. The brokers to whose agent I gave a portion of the first-named sample say:—

“We have pleasure to advise you that there would be a ready market for this hemp if it could only be produced in fair to large quantities, and be cleared free from the bark or husk, of which your sample contains so much. We find the colour and strength both very good, and we could dispose of large quantities of this hemp at about equal to £20 per ton c.i.f. London, if it could be cleaned as stated above. If the hemp could be produced a foot longer or so, it would be more valuable. The great beauty of this hemp is its exceptional strength; and no doubt if it could be produced in large enough quantities and the strength increased, it would sell quickly and equally with Manila hemp, the present price of which is, say, £33 to £34 per ton.”

“The remainder of Mr. Dunn’s sample, and also that from Mr. Harrison, were forwarded to Kew; and Mr. D. Morris, the Assistant Director, says of Mr. Dunn’s sample:—“The fibre from Zululand, which we have accepted as derived from *Gomphocarpus physocarpus*, is evidently possessed of merit, and we forwarded a sample of it to Messrs. Ide and Christy for valuation and report. Of course you noticed that the specimen was in a very rough state, and very indifferently cleaned. Hence the brokers’ report, which I enclose, is not conclusive as to the value of the fibre, if carefully and fully cleaned and presented at its best. In this, as in most fibres, the whole thing turns on questions of quality

and quantity, and whether it can be placed in the market at such a price as will compete with fibres already known and with an established reputation.' Of Mr. Harrison's sample he says:—'In their present condition they are useless for textile or rope-making purposes. The only use to which they could be applied in this curled-up, crushed state, is for paper-making.'

'The broker's report on Mr. Dunn's fibre is as follows:—'This is so imperfectly cleaned that the full merits of the fibre are apparently not disclosed, and in its present condition it would only be available for cordage purposes or as an adulterant of, say, manila or other white hems of commerce. The fibres apart from the adherent tissue, which would be removed under better preparation, are of excellent colour, but the strength is rather disappointing as compared with manila. From the different character of fibres obtained from endogenous and exogenous plants respectively, it is always difficult to estimate their relative strength otherwise than by taking a given weight of each, and placing them on a testing machine that would properly record their breaking strain.'

'We estimate the value of the *Gomphocarpus* fibre in its present condition at £15 per ton, but thoroughly cleaning would enhance its value 75 to 100 per cent. It is probable, too, that perfectly prepared fibre would find its best market as a material for textile purposes, as a supplement to flax, but we should like to see a thoroughly well-cleaned specimen before giving a definite opinion.'

'With respect to length of the fibre, I may say that, in my opinion, there would be no difficulty in increasing it considerably, provided the plant was cultivated. The specimens sent were prepared from wild plants, which of course are liable to branch repeatedly, and this would not take place if the plants were grown thickly together. The matter of more complete cleaning must be left for further experiment.'

At the annual meeting of the Tendring Hundred Farmers' Co-operative Society, it was stated that the sales during the preceding twelve months had amounted to over £5,000. This makes an average of £100 per member. The Right Hon. J. Round, who presided at the meeting, said, during the course of his remarks, that his experience of the House of Commons had shown him that, whenever any trade interest other than farming was affected, those interested in that trade were well organised and thoroughly united; but that when it was a matter affecting agriculture, there was a lack of that unity whose necessity was recognised by all other trades.



ROYAL AGRICULTURAL SHOW.
First Prize Shropshire Down, Ram.
Exhibited by Mr. P. D. Simmons, Mooi River.



Locusts in June.

IN my previous memorandum the movements of locusts were dealt with for May and the first half of June. The following notes are based upon information reaching this office between the first and thirtieth of June, so that part of the period previously covered is also included in this report. During June, only 68 reports were received, as against 109 for May. Whether this is due to a diminution in the number of swarms or to a lack of enthusiasm amongst my correspondents I am unable, at this moment, to say.

It is very evident, from the information to hand, that locusts are hibernating successfully from the north of Zululand to Alfred County; and large swarms are settled or circling about certain districts, following, to a great extent, the river valleys a few miles back from the Coast.

Early in the month locusts were circling about the Maringo and Murchison Flats, in Alfred County, but of these nothing further has been heard since the 13th. Alexandra County would appear to be remarkably free, as only one swarm has been reported, and that at the very beginning of the month. There seems to be very few locusts in Durban County; at the back of the Umlazi Location towards Stony Hill there is, I am informed, a swarm settled in the bush. In the Upper Umkomanzi Division locusts are still prevalent, Mid-Illovo, Beaumont, and Richmond reporting settled or circling swarms. During the month, four swarms appear to have visited the neighbourhood of Richmond; one of some magnitude remained in the vicinity from the 12th to the 15th, and a large swarm—probably the same—reappeared on the 24th. A swarm was reported at Thornybush on the 10th; this arrived at Maritzburg on the 18th, and remained in the environs of the City until the 24th. Until the middle of the month swarms were reported from Krantzkop. In some of these fungus disease was still prevalent, and the swarms were noted to be travelling Coastwards. Victoria County is not very seriously infested; there appear to be several swarms

about Mapumulo, Kearsney, Stanger, and inland from Tongaat. These were circling about until the middle of the month. Since then no reports have reached me.

From Zululand, the reports are also meagre, with the exception of the Entonjaneni Division. Here it would appear that a number of swarms are hybernating in the Umfolozi and Umhlatuzi Valleys. There are also swarms in the neighbourhood of the Nkandhla, and along the Coast from Somkele to Inyoni. Early in the month numerous swarms were reported about Hlabisa, but there was a certain amount of freedom from the pest until the 19th, when a huge swarm, 5 by 30 miles in extent, was reported to be flying N.E. A very large swarm arrived at Eshowe on the 16th from the west and departed, travelling S.E., on the 17th. This swarm is probably identical with one observed at Krantzkop the day before, and on the 19th at Hlabisa.

As a matter of interest, it may be pointed out that two correspondents report that the swarms in their vicinity go down to the river for the day, returning to the hill-sides at night—probably attracted by the warmth radiating from the krantzes.

The fungus disease has now lost all its virulence, little or no mention of it being made in reports dated subsequent to the first week of the month.



A NEW COTTON TROUBLE.

During June, Mr. John Kirkman, M.L.A., submitted a large collection of diseased cotton bolls representative of the whole of his crop at Umzinto.

Appended is my report to Mr. Kirkman. However, since that was written a survey of Mr. Kirkman's and Mr. Thompson's cotton fields has been made, and I am now inclined to alter the view therein expressed that an insect has been the primary factor in the destruction of the crop. There is, of course, no doubt in my mind concerning the devastating effect of the insect nor that its attack on the bolls is followed by fungus decay of the tissue; but there is abundant evidence that a rot, quite apart from the insect's attack, has developed and played the most important part in the destruction of the bolls. The exact nature and causation of this disease is not at present clear; but, from the evidence before me, it appears to have been brought about by uncongenial weather conditions.

It may be explained that Mr. Kirkman's and Mr. Thompson's fields lie about four miles apart and are separated by a range of hills. In one

case the disease and the insect are predominant, in the other both are rare. At both the growth of the plants has been excellent. Mr. Kirkman will not, I understand, gather more than 20 per cent. of his crop, whilst Mr. Thompson's is very satisfactory. Already a large amount has been harvested, and the yield of lint cotton from the 18 acres gives promise of figuring out between £200 and £270.

At Mr. Kirkman's there is a considerable amount of indigenous bush in close proximity to the plantations; this, I am of opinion, accounts largely for the gravity of the insect attack, because at Mr. Thompson's there is no bush at all. Further, I learn that Mr. Kirkman planted earlier than Mr. Thompson; this circumstance, connected with the fact that throughout March and April continuous rains fell, is sufficient in itself to account for the development of the disease, because the bolls which should have opened in March, through the lack of sunshine, did not open until the middle of May.

Copy of Report to Mr. Kirkman.

This report is based upon an examination of about 150 bolls selected at random from amongst the consignment reaching me on the 26th June. Of this lot 100 were critically examined. The bolls are in various stages of growth, and, with but two exceptions, all those examined were unsound internally.

Upon a few I have noticed a superficial fungus parasite, but this has no connection with the trouble with which the bolls are assailed.

A casual examination of the bolls (50) showed at once that a considerable number were infested by a caterpillar, and the contents of all were seen to be suffering from fungus attack. At the first glance, the trouble seemed to be a form of "boll rot" accompanied by insect attack, but, having made a very careful examination I arrived at the conclusion that the trouble is due to the insect as the primary factor, and the decay to saphrophytic organisms following the attack of the insect.

Of the hundred bolls critically examined, 80 contained caterpillars. As a general rule there is but one caterpillar in each boll, but occasionally two and three are met with. These insects feed within the seeds, and it is not until they are reaching full growth that they make galleries in the boll. When nearly full grown they bore a hole through the capsule of the boll so as to provide a means of exit for themselves when moths. In the majority of cases coming under observation the caterpillars were found ensconced in a seed; the only indication of their presence being the discoloured and decaying appearance of the fibre about the seed.

There is no indication of the presence of an insect in the boll up to a certain stage in the caterpillar's development.

The 20 diseased bolls in which I was unable to find insects may be suffering from boll rot, and if this is so then the two troubles are con-

current. However, it is possible that the disease has been set up by punctures made by other insects (plant-bugs).

It is only right to say there is a possibility that the bolls are suffering from rot quite apart from the caterpillar attack, but it is more reasonable to assume that the decay is due to organisms (moulds, and perhaps bacteria) which have gained an entrance to the tissue subsequent to the attack of the insect. I find that, before the caterpillar comes to maturity, the whole boll becomes decayed throughout, and this state of affairs does not interfere with its development.

It is not always usual for these disturbed conditions to follow such cases of insect attack, and when they do and the insect flourishes amongst the decayed tissues, it rather tends to support the argument that the decay is secondary. For example, ordinary fruit fly maggots, when developing in oranges, often set up so much decay and fermentation that they themselves are destroyed by the conditions that they have brought about; on the other hand, the *Carpocapsa* caterpillar of the orange and naartje sets up decay very rapidly in oranges, but this condition is never inimical to the complete development of the caterpillar.

It is of importance to add that the caterpillars pupate in the bolls, so that the destruction of all that are infested is a most important measure of control.

It seems reasonable to anticipate that the best preventive means at our disposal will be found in spraying with a poison fungicide, but until further data are obtained as to the exact manner of oviposition no definite statement can be made on this point.



BIRDS, PETS AND PESTS.

As I have several times had occasion to draw attention to the danger attendant upon the casual introduction of small animals, particularly birds—more especially with reference to the acclimatization of that greatest of bird pests, the English sparrow—now going on in Durban, it is somewhat interesting to notice the results which have attended the sentimental introduction of such creatures into other countries.

According to a Bulletin recently published by the New Zealand Government, the acclimatization in that country of small foreign birds has upon the whole proved a mistake. Virtually all that have been brought into that Colony are now proving themselves nuisances to the farmer and fruit-grower.

The following are described as "unmitigated pests":—Sparrows, greenfinches, blackbirds, thrushes and larks, the last-mentioned being credited with doing enormous damage to young wheat. Despite the fact that so much evil has already been accomplished, it appears that a great many people in New Zealand are now asking for an embargo upon the further introduction, upon any account, of foreign birds.



THE GIPSY MOTH IN AMERICA.

The ease with which the dissemination of insect and other pests may be effected is little realised by the average farmer or fruit-farmer; and still less is anticipated the trouble attendant upon individual—and even upon organised—efforts to eradicate the pest when once it has established a tolerably firm foothold.

A striking instance of this is afforded by the case of the Gipsy Moth (*Porthetria dispar*, L.) in the United States, related in a recent "Farmers' Bulletin" issued by the U.S. Department of Agriculture. In 1869, Prof. Leopold Trounvelot, who was connected with the astronomical observatory at Harvard University, occupied himself at odd times, for his own pleasure and interest, in the study of wild silkworms, with the idea that species of commercial value might be found and that perhaps something might be done in the way of cross-breeding to produce a hardier insect than the silkworm of commerce, and one which, perhaps, might prove to be resistant to the pebrine disease what at that time was playing havoc in the silkworm establishments of Europe. He imported different silk-spinning caterpillars in various stages of existence, and, among others, egg-clusters of the gipsy moth. He lived at Medford; and raised caterpillars on a shrub in his yard, enclosing them with netting. During a gale the net was torn and the insects scattered. He searched for them, and destroyed those found; he also gave notice of the probable escape of the species, but the affair was soon forgotten. For many years the insect was not noticed by the people of Medford, and it probably increased very slowly. It is supposed that it was gradually accommodating itself to the climate, and it is known that the neighbourhood abounded with insectivorous birds and that adjoining woods were frequently burned over. Eventually the insect became noticeable, and by the summer of 1889 had multiplied to such an extent as to become a notorious pest. Then for the first time specimens were sent to the State Agricultural

Experiment Station at Amherst and determined by Dr. H. T. Fernald as the well-known gipsy-moth of Europe.

The town of Medford raised a sum of money to fight the insect, and in the spring of 1890 the State appropriated £5,200, a corresponding amount being, in addition, appropriated early in June. Other appropriations followed from year to year with gradually increasing amounts. The last appropriation was expended in 1899, and the legislature refused to vote further sums for 1900 and the following years. In 1905 the appropriations were renewed, and the work has since been carried on under a well-founded State law. Although appealed to on several occasions, the National Government took no steps to assist the State of Massachusetts in its fight against the gipsy-moth—with the exception of a small appropriation made in 1905 for the purpose of introducing its natural enemies—until last year. Congress then voted a sum equivalent to approximately £17,200, to be expended by the Secretary of Agriculture, through the Bureau of Entomology, for the purpose of preventing further spread of the gipsy moth and the brown-tailed moth; and active work is now going on under this appropriation.

The need for a certain amount of State control in order to prevent the introduction and dissemination of harmful insects and other pests is, from this instance above, apparent. Such a pest may be likened to a grass fire. It is very easy to start, either voluntarily or otherwise; and at first it will do no harm. At the start it is very easy to put out; but the longer it is left to burn on, the greater will be the amount of effort required to be expended to put it out.

H. J. C.

The Durban Show.

THE success that attended the efforts of the Royal Agricultural Society in the organisation of its Show last month was also experienced by the Durban and Coast Society of Agriculture and Industry during the current month; though in both cases the full measure of interest was wanting by reason of the enforced absence of entries in the cattle classes.

On the 18th, 19th and 20th of July, in the midst of a successful "season" with the town full of visitors from other parts of Natal and from the Transvaal, O.R.C., Cape Colony, and other parts of South Africa, the Durban and Coast Society held its Show in Durban. Though

not entirely of a favourable nature, the weather was sufficiently clear to permit of the attendance of thousands of visitors, which attendance swelled to great proportions on the afternoons of Friday and Saturday, the 18th and 19th.

The exhibits in practically all classes were excellent, and again testified—as in the case of the Maritzburg and other Shows—to the possibilities this Colony possesses in the direction of agricultural and industrial development. Of particular interest, perhaps, at the present juncture, were the exhibits of cotton by Mr. J. Kirkman, M.L.A., and of various other fibres, by Messrs. Wm. Cotts & Co. With the cotton (which consisted of several bales, and comprised both ginned and unginned cotton) was exhibited a small, hand-power gin, which undoubtedly proved of interest to many who are contemplating the cultivation of cotton. All our staple industries and crops were well represented, as well as a host of minor ones, many of them of promise. The interesting exhibit of the Natal Oil and Soap Co., consisting of a great pyramid of soap set on a groundwork of soap shavings and surrounded by a low wall of soap, attracted much attention from townspeople and farmers alike. To farmers this new industry is of peculiar interest, affording as it does promise of an extensive market in the near future for earth nuts, castor oil beans, and the sundry other vegetable oil products that do so well in various parts of the Colony. At present there is no market worth speaking of for these products, and the prospect of a ready sale for all that can be produced should prove a stimulant to the cultivation of such plants. Jams, jellies, and bottled fruits were represented in extensive variety; and other confectionery, such as biscuits and cakes, compared well with the imported article.

Space prevents the examination of even a portion of the many exhibits of interest, either in the purely agricultural, live stock, or industrial sections; but those responsible for the organisation of the Show may be congratulated upon the success which has attended their efforts. If the Durban and Maritzburg Shows have done nothing else, they have brought before the people of those towns many industries the existence of which they were probably formerly unaware; and they have shown the steady progress the Colony is making towards a time when it will be not only self-supporting, but will also be in a position to export an increasing surplus production. There unfortunately exists an unreasonable disdain for everything "Colonial": tea, sugar, coffee, jams, sweets and other confectionery, and soap (to mention a few of our products) produced in the Colony cannot possibly compare with imported stuff (no matter where the imported article hails from!) in the eyes of many people, and so money is sent out of the Colony and local industries have to struggle against adverse circumstances and depend upon the demand in other parts of South Africa.

Natal Agricultural Statistics.

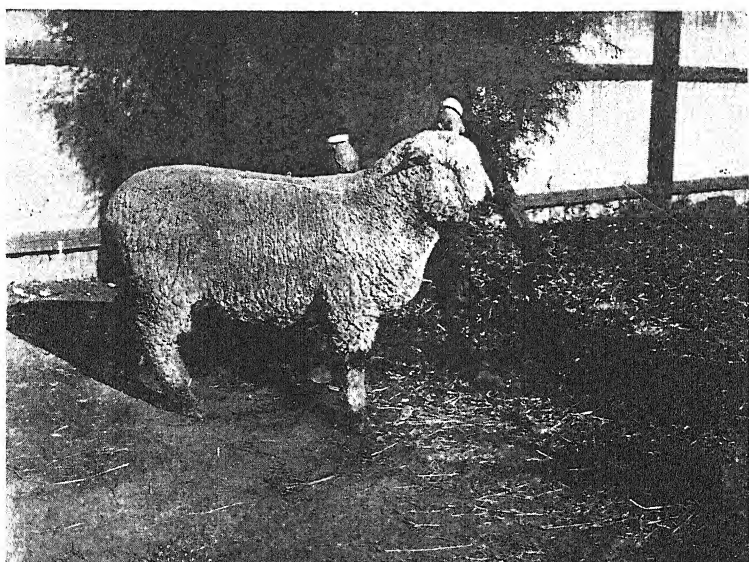
RESULTS FOR THE SEASON 1905-6.

AFTER considerable delay, occasioned by various staff changes and by pressure of work, the compilation of the agricultural statistics of the Colony for the year ended 30th ^{June} January, 1906, has now been completed, and the results, so far as European farming is concerned, are set out in the tables that follow. The totals for each of the Magisterial Divisions will appear in the Statistical Year-Book to be published shortly.

I.—LAND CULTIVATED BY EUROPEANS.

Nature of Crop and Number of Acres of Land in each Crop reaped during the Year.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast. acres	Midland. acres	Upland. acres	Coast. acres	Inland. acres	
Total Number of Acres Cultivated	89,884 ³	146,012	81,269 ²	1,151 ²	3,455	321,773
Aloes ...	85 ¹	51	7	...	...	143 ¹
Amadumbe (<i>Colocasia</i>) ...	56	19	18 ¹	37 ²	1	132 ²
Arrowroot ...	28 ¹	6	1 ¹	...	...	36
Barley for Grain ...	8	88 ¹	457	...	1 ¹	555 ¹
Beans ...	355	1,024 ¹	254 ¹	13	2 ²	1,650
Buckwheat ...	10	92	235 ¹	...	...	337 ¹
Cayenne Pepper ...	16 ¹	...	1	...	...	17 ¹
Coffee ...	115 ¹	5 ¹	...	...	...	121
Cotton ...	146 ¹	49 ¹	1	15	...	211 ¹
Earth Nuts ...	24 ¹	25 ¹	58	1 ¹	...	109
Exotic Grasses ...	54 ¹	1,260 ¹	1,889	...	1	3,204 ¹
Green Crops for Fodder:—						
Barley ...	9 ¹	693 ¹	1,313 ¹	...	5	2,021 ¹
Millet ...	7	930 ¹	1,433 ¹	...	14	2,385 ¹
Oats ...	15 ¹	2,860	3,238	...	...	6,113 ¹
Sugar Cane ...	241 ¹	869 ¹	195	...	...	1,306 ¹
Other Green Crops ...	4 ¹	1,029 ¹	589 ¹	...	12	1,635 ¹
Hay ...	...	516	1,483	...	...	2,003
Kafir Corn ...	78	3,234 ¹	3,959 ¹	19	2 ¹	7,293
Lucerne ...	45 ¹	68	400 ¹	...	1 ¹	515 ¹
Mangolds ...	20 ¹	34 ¹	39 ¹	...	...	95
Mealies ...	6,419	58,832 ¹	45,086 ¹	363 ¹	1,785	112,486 ¹
Millet for Grain ...	1	158 ¹	225 ¹	...	...	385 ¹
Oats for Grain ...	...	90 ¹	885 ¹	...	...	975 ¹
Onions ...	1	45	88 ¹	...	...	134 ¹
Orchards ...	29,610	1,222 ¹	2,851 ¹	70	3 ²	33,785 ¹
Peas ...	10 ¹	124	191 ¹	...	...	325 ¹
Potatoes ...	437 ¹	2,131 ¹	2,973 ¹	15 ¹	11 ¹	5,569 ¹



ROYAL AGRICULTURAL SHOW.

First Prize Merino Ram.

Exhibited by Mr P. Otto, J.P.

I.—LAND CULTIVATED BY EUROPEANS.—Continued.

Nature of Crop and Number of Acres of Land in each Crop reaped during the Year.

Description.	NATAL.			ZULULAND.		Whole Colony. acres
	Coast. acres	Midland. acres	Upland. acres	Coast. acres	Inland. acres	
Pumpkins	245½	480½	644	7	5	1,382½
Sugar Cane—Total area under Crop	40,298	42	31	533	...	40,904
Sugar Cane cut during 1905-6 ...	10,849	8½	22	...	...	10,879½
Sunflower	44½	54½	90½	2½	...	191½
Sweet Potatoes	700	417	240½	29½	54	1,441
Tea	4,282	44	...	...	...	4,286½
Tobacco	71	138½	247½	1	6½	464½
Turnips and Swedes	8	477½	890½	...	...	1,375½
Vegetables	83	191	92½	2	...	368½
Wattles—Total area under cultivation	6,316	66,471	5,456	40	1,520	79,803
Wattles planted during 1905-6 ...	1,366	8,104½	1,169	...	312	10,951½
Wheat	1	259	368	...	...	628
Winter Fodder—Area set aside for	12	1,867½	5,132½	...	...	7,011½
Other Crops	19½	145½	200½	...	...	365½
Irrigated Land	161	15,942½	7,413	2	53	23,571½

II.—CROPS REAPED BY EUROPEANS.

Nature of Crop and Quantity or Value of Produce obtained.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Aloes (fibre, tons ... ..	...	...	22	...	...	22
Amadumbe (<i>Colocasia</i>), muids ...	4,106	233	359	537	13	5,248
Arrowroot, cwt.	204	49	...	...	...	253
Barley (grain), muids	35	764	704	...	...	1,503
Beans, muids	801	3,733	778	81	2	5,395
Buckwheat, muids	30	233	693	...	...	956
Cayenne Pepper, lbs.	7,304	10	300	...	...	7,614
Coffee, lbs.	31,142	10	...	...	...	31,152
Cotton, lbs.	19,480	235	...	150	...	19,865
Earth Nuts, muids	255	504	134	28	...	921
Ensilage, tons	60	2,493	1,060	...	...	3,613
Exotic Grasses, tons ... ..	...	227	278	...	...	505
Fruit Sold, £	15,557	2,211	3,051	2	...	20,821
Fruit, Canned, £	90	322	1,664	...	...	2,076
Fruit made into Jams & Jellies, £	32	476	837	...	...	1,345
Green Crops for Fodder:—						
Barley, tons ... ..	...	999	1,838	...	...	2,837
Millet, tons	6	912	2,240	...	...	3,158
Oats, tons	10	5,475	2,894	...	...	8,379
Sugar Cane, tons	801	7,200	124	11	...	8,142
Other Green Crops, tons ...	32	1,394	527	...	...	1,955

II.—CROPS REAPED BY EUROPEANS.—*Continued.**Nature of Crop and Quantity or Value of Produce obtained.*

Description,	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Hay (veld), tons ...	292	10,370	7,708	...	43	18,413.
Hay (meadow), tons ...	...	101	1,427	...	...	1,528
Kafir Corn, muids ...	198	6,409	20,458	65	12	27,142
Lucerne, tons ...	50	276	162	...	1	489
Mangolds, tons ...	2	340	298	...	...	640
Mealies, muids ...	36,721	304,901	217,196	1,220	8,003	568,041
Millet (grain), muids ...	90	917	441	1	...	1,449
Oats (grain), muids ...	...	335	1,878	...	...	2,213
Onions, muids ...	...	1,560	4,196	...	...	5,756
Peas, muids ...	37	541	429	...	...	1,007
Potatoes, muids ...	10,822	59,286	67,404	130	88	137,730
Pumpkins, grown among mealies, tons ...	65	3,249	1,699	7	6	5,026
Pumpkins, grown separately, tons ...	166	375	417	...	...	958
Sugar, tons ...	116,002	6	...	...	...	116,008
Molasses, etc., lbs. ...	2,701,240	...	...	...	...	2,701,240
Sunflower Seeds, muids ...	500	369	300	7	...	1,176
Sweet Potatoes, muids ...	19,689	16,205	1,440	873	86	38,284
Tea, lbs. ...	1,508,408	12	35	...	...	1,508,455
Tobacco, lbs. ...	44,534	43,343	126,875	2,010	1,208	217,970
Timber Sold, £ ...	245	2,865	5,059	...	30	8,199
Turnips and Swedes, tons ...	42	6,374	4,406	...	...	10,822
Vegetables Sold, £ ...	957	1,146	1,418	21	...	3,542
Wattle Bark, tons ...	640	9,982	1,002	...	107	11,731
Wattle Timber Sold, £ ...	125	12,395	959	...	84	13,563
Wheat, muids ...	...	722	1,837	...	...	2,559

III.—AVERAGE YIELDS OF CROPS.

Nature of Crop and Average Yield obtained per Acre in each Crop.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Barley (grain), muids ...	...	7'3	5'2	...	...	5'8
Barley (forage), tons ...	...	3'0	2'3	...	...	2'8
Beans, muids ...	3'5	3'3	3'7	2'8	4'0	3'6
Buckwheat, muids ...	...	4'6	4'0	...	...	4'3
Hay, tons ...	...	1'5	1'9	...	...	1'8
Kafir Corn, muids ...	5'7	4'0	5'1	5'4	5'0	4'9
Mangolds, tons ...	5'0	10'9	10'0	...	...	9'4
Mealies, muids ...	6'2	5'6	5'2	3'3	3'4	5'5
Millet (grain) muids ...	...	4'4	5'5	2'0	5'0	5'5
Millet (forage), tons ...	...	2'0	2'5	...	...	2'3
Oats (grain), muids ...	...	5'9	4'5	...	...	8'1
Oats (forage), tons ...	1'0	1'6	1'6	...	...	1'6
Onions muids ...	...	40'0	63'8	...	...	50'4

V.—LIVE STOCK

Live Stock in possession of Europeans on August 31, 1906.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Stallions, imported ...	2	45	66	..	...	113
Stallions, Colonial ...	18	244	385	3	2	652
Brood Mares ...	36	3,050	5,857	3	46	8,992
Saddle Horses ...	1,965	2,848	4,027	38	59	8,937
Other Horses ...	522	2,868	5,777	5	17	9,189
Horses Sold during 1905-6 ...	54	962	1,309	2	13	2,340
Mules ...	908	165	577	1	55	1,706
Donkeys ...	539	499	684	14	23	1,759
Bulls, imported ...	24	44	55	1	3	127
Bu'lls Colonial ...	274	1,610	1,936	65	37	3,922
Cows ...	4,363	34,764	33,803	602	561	74,093
Oxen ...	7,196	28,169	29,394	890	981	66,630
Other Cattle ...	3,791	35,253	48,488	956	597	89,085
Cattle Sold during 1905-6 ...	801	7,592	10,789	226	160	19,568
Cattle available for slaughter ...	192	3,048	5,310	70	125	8,745
Rams, imported ...	...	130	195	...	2	327
Rams, Colonial ...	3	2,809	5,155	5	18	7,990
Sheep, Woolled ...	90	153,882	369,069	...	1,371	524,412
Kafir Sheep ...	261	8,702	39,440	558	1,055	50,016
Persian Sheep ...	7	2,994	13,899	...	...	16,000
Sheep Sold during 1905-6 ...	30	18,263	35,199	336	...	53,828
Sheep available for slaughter ...	...	10,372	26,644	...	...	37,016
Angora Rams, imported ...	...	157	34	...	...	191
Angora Rams, Colonial ...	...	69	1,090	4	6	1,169
Angora Goats ...	81	2,983	74,552	...	120	77,736
Kafir Goats ...	1,567	5,744	30,704	580	736	39,331
Goats Sold during 1905-6 ...	415	1,510	10,974	449	19	13,367
Pig ons ...	2,248	2,577	2,253	337	60	10,475
Boars imported ...	10	19	17	2	2	50
Boars, Colonial ...	122	502	758	17	37	1,426
Sows ...	702	2,255	2,582	114	66	5,719
Other Pigs ...	2,457	7,678	5,768	243	96	16,242
Pigs Sold during 1905-6 ...	986	6,472	4,037	86	...	11,581
Pigs available for slaughter ...	797	4,027	2,278	150	2	7,254
Fowls ...	49,391	84,233	84,464	2,640	1,970	222,698
Ducks and Geese ...	3,464	6,610	1,432	142	384	12,032
Turkeys ...	393	2,164	4,533	15	94	7,199
Guinea-fowls ...	2,256	11,778	4,627	...	8	18,669
Poultry Sold during 1905-6 ...	2,691	10,675	13,423	330	50	27,169
Rabbits ...	1,447	657	422	72	...	2,598
Ostriches ...	1	449	4	...	...	454
Bee Hives ...	283	598	318	7	...	1,206

VI.—ANIMAL PRODUCTS.

Nature and Quantity or Value of Animal Products turned out during the Year.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Bacon and Hams, lbs. ...	21,386	164,652	143,854	886	4,061	334 839
Brawn, lbs. ...	110	2 400	933	...	...	3 443
Hides, Horns, and Hoofs, £ ...	643	363½	960½	...	...	1 967
Lard, lbs. ...	3,283	19,510	24,361	100	242	47,496
Meat, other than Pork, lbs. ...	9 840	20,784	111,445	800	50	142,919
Pork, lbs. ...	18,011	55,222	51,734	450	...	125,417
Tallow, cwts. ...	1,333	955½	26½	...	...	2,314½
*Butter Sold, other than to Creameries, lbs ...	15,274	169,269	202,716	2,275	3,492	393,026
†Cheese, lbs. ...	720	1,650	10,490	...	...	12,860
‡Milk Sold other than to Creameries, lbs. ...	15,450	63,647	49,738	1,315	...	130,150
†Eggs, dozens ...	39,634	126,266	91,378	772	3,403	261,453
Honey, lbs. ...	752	4,521	3,241	...	...	8,514
Ostrich Feathers, £ ...	...	560	30	...	...	590
Mohair, lbs. ...	...	57,006	151 608	...	360	208,974
Wool, lbs. ...	475	572 943	1,306,897	...	4,300	1,884 615

VII.—FARM LABOUR.

Numbers of Europeans, Natives, and Indians employed, with Average Wages paid to Natives.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
European Farm Hands ...	178	124	170	6	1	479
Natives—						
Men ...	2,098	6,437	5,090	317	368	14,310
Women ...	267	884	2,201	27	47	3,426
Indians, Free—						
Men ...	832	242	140	18	3	1,235
Women ...	110	35	22	3	...	170
Indians, Indentured—						
Men ...	7,307	2,011	873	151	3	10,345
Women ...	3,330	398	169	54	...	3,951
<i>Average Wages paid per Mensem to Natives—</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
Men ...	19 7	15 10	11 6	17 6	13 6	15 7
Women ...	7 6	9 10	5 6	3 9	7 0	6 8

* Approximately 300,000 lbs. of Butter were, in addition, manufactured by Creameries.

† Approximately 25,000 lbs. of Cheese were, in addition, manufactured by Creameries.

‡ Approximately 500,000 gallons of Milk were, in addition, sold by Creameries.

§ Approximately 100,000 dozen eggs were, in addition, sold by Creameries.

Landbouw Co-Operatie.

Door E. T. MULLENS, Secretaris, Landbouw Ministerie.

DIT artikel is opgesteld met het doel om de vraag te beantwoorden: Welke is de beste vorm van Landbouw Co-operatie voor Natal? Ten einde tot een antwoord tot deze vraag geraken is het, in de eerste plaats, noodig om na te gaan wat in andere landen gedaan is, opdat de fouten door de pioniers der beweging begaan niet in deze Kolonie herhaald zullen worden, en opdat wij ons voordeel kunnen doen uit de opgehoopte ondervinding thans beschikbaar.

Denemarken wordt erkend door allen die de zaak onderzocht hebben als verre weg voor alle andere landen ten opzichte van landbouw co-operatie; en eene korte beschrijving van wat aldaar gedaan is zal een goed begrip geven van de zeer groote voordeelen—inderdaad de omwenteling—te weeg gebracht door landbouw co-operatie. Als een gevolg van de verschillende Europeesche oorlogen, was Denemarken, uit een landbouw oogpunt, zoo te zeggen geruineerd, daar het, buiten de gewone verwoesting veroorzaakt door de oorlogen, beroofd werd van de beste landbouw gronden en tot nauwe limieten beperkt werd. Van deze beperkte oppervlakte bestond een heel groote deel uit vlei land en zandduinen—schijnlijk tot niets anders geschikt dan het woeden van winden en stormen daarover. Met het doel om het land te herstellen werd het Deensche Heide Genootschap opgericht in 1866. Paden werden gemaakt, besproeiings schema's ten uitvoer gebracht, Kolonies angelegd, spoorwegen gebouwd, en plantages aangeplant, de finale uitslag van des Genootschaps werkzaamheden zijnde dat 25,000 akkers zand grond in vruchtbare streken veranderd werden en 75,000 akkers beplant werden met kegelvormige boomen, twee proef stations werden daargesteld en 400 model plaatsen georganiseerd werden in alle deelen van het land waar heide te vinden was. Later werden pogingen aangewend door andere genootschappen om de zuivel nijverheid te verbeteren, en in verband daarmee werd de pluimvee en varken teelt bij de hand genomen. Daar de zuivelboerderij zich ontwikkelde en Engeland de voornaamste markt voor Denemarken werd, heeft het Deensche Gouvernement deskundigen naar Ierland afgevaardigd om onderzoek te doen naar de methoden van de teelt en voeding destijds in zwang om de kwaliteit van varkens te produceeren, die door het Iersche Spekbereidings Genootschap vereischt werd. Varkens werden uit Ierland in Denemarken ingevoerd en, tengevolge van de co-operatieve beweging, werd er zooveel voortgang met de ham en spek nijverheid gemaakt dat Denemarken zoo te zeggen er in slaagde de Iersche ham

en spek industrie uit de Enelsche markt te verdrijven. Als een gevolg van pogingen aangewend door Sir Horace Plunkett om de landbouw in Ierland te herstellen, werd een Iersch Landbouw Departement gevormd en, in 1903, werd, op verzoek van het Landbouw Departement, eene deputatie vertegenwoordigende de Iersche Landbouw Industrie, op haar beurt naar Denemarken gezonden om rapport te doen omtrent de wijze van de spek bereiding in gemeld land en om te probeeren uitvinden welke methoden door de Deensche boeren en kooplieden gevolgd worden waardoor zij zoo goed slaagden om co-operatieve ham en spek fabrieken voor hun gedurig toenemenden handel op te richten. Het kostelijke rapport op "Co-operatieve Genootschappen en de landbouw condities in Denemarken" door de leden dezer deputatie gedaan, schreef het geheele succes der Deensche boeren toe aan co-operatie. De indruk op de leden der deputie en op de ambtenaren van het Iersche Landbouw Departement gemaakt door hun onderzoek was zoo treffend dat er dadelijk maatregelen genomen werden om de landbouw industrie van Ierland te organiseeren op dezelfde voet, met het gevolg dat op zijn beurt is Ierland vooruitgegaan. De aanwas van de co-operatieve spekbereiding in Denemarken van af 1888, toen men eigenlijk een begin ermee maakte, tot 1902 was volgens de deputatie als volgt:—

	Aantal fabrieken.	Aantal Varkens gedood.	Waarde.	Gemiddeld prijs per varken.
1888	1	23,407	£57,000	£2 9 0
1902	27	777,232	£2,500,000	£3 4 6

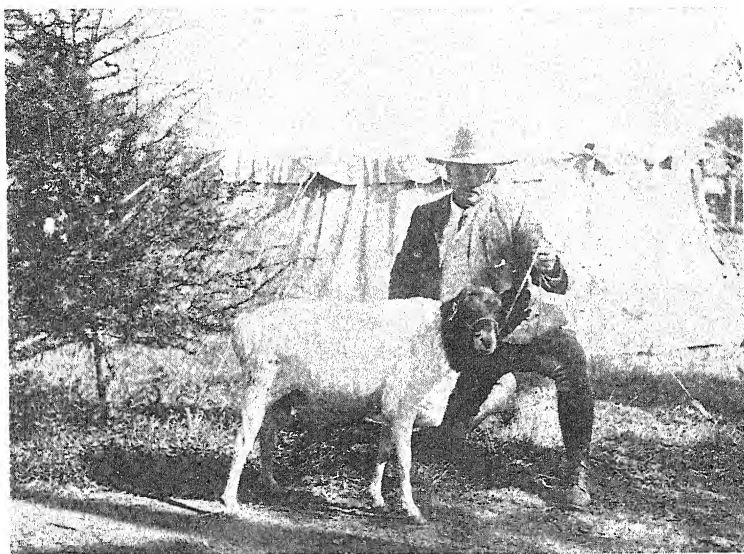
Dus zal gezien worden, wat alleen deze eene nijverheid betreft, hoe enorm de vooruitgang was die door co-operatie teweeg gebracht werd, en het belangrijk feit valt in het oog dat, hoewel het aantal varkens zoo enorm toegenomen was, de gemiddelde prijs per varken gestegen had van £2 9s. tot £3 4s. 6d. De toeneming van den gemiddelden prijs per varken was opklimmend van jaar tot jaar.

De eerste co-operatieve zuivelzaak werd in West Jutland in 1882 geopend en in 1902 waren er niet minder dan 1050 zoodanige zuivelzaken in Denemarken met een tedental van 148,000 die 750,000 koeien hadden uit een totaal van 1,067,000 melkkoeien in het geheele land. In 1902 voerde Denemarken uit, hoofdzakelijk naar Groot Brittanje 135 millioen ponden boter en het bedrag belegd in de oprichting en toerusting van de zuivel zaken was ruim £1,500,000. Op een feit in verband met deze enorme ontwikkeling in Denemarken moet vooral gelet worden, wat de condities in Natal betreft, namelijk dat *het initiatief steeds van de menschen zelf gekomen is*. De neiging in Denemarken is niet alleen geweest slechts de jaarlijksche opbrengst te vermeerderen, maar om de kwaliteit van het produkt zelf te verbeteren—zoo zeer is dit het geval dat de boeren van Denemarken onderwerpen zich vrijwillig aan zulke strenge restricties door hunne eigen co-operatieve genootschappen

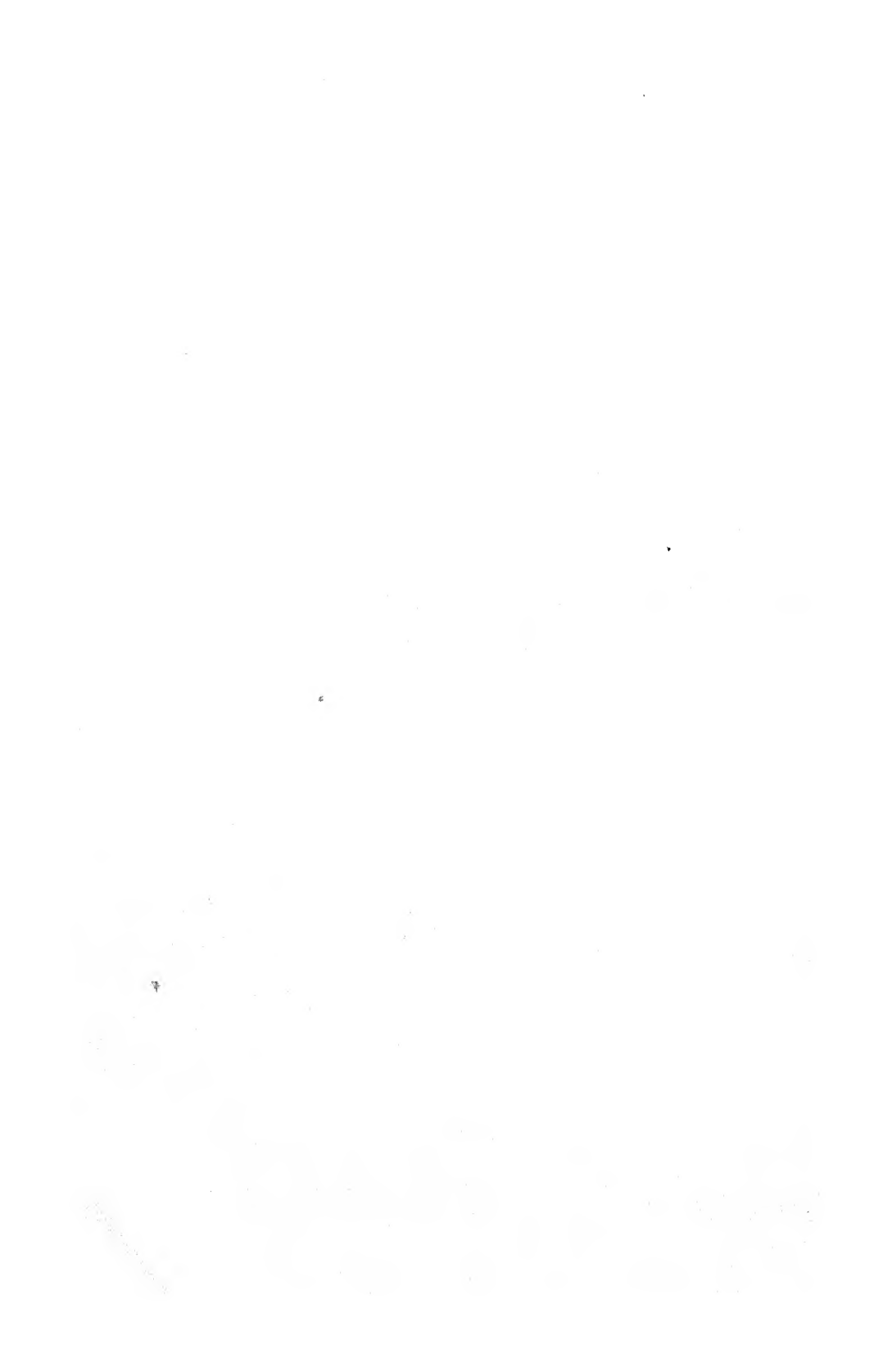
opgelegd, als gewis onze zuivel industrie de doodsteek zouden geven als dergelijke restricties in Natal toegepast zouden worden. Regels worden door de Co-operatieve Melkerijen neergelegd waardoor de eigenaars van koeien gebonden worden om aan de Melkerij te leveren, voor een tijdperk van tien jaren, de melk van al de melkkoeien, welke de boeren ten eenigen tijd in hun bezit mogen hebben—met uitzondering alleen van de melk noodig voor huisgezinnen, d.w.z. voor het gebruik van hun eigen en van andere huisgezinnen in hunne eigen distrikten. Als eenig lid zich wil onttrekken aan de Melkerij voor de eerste tien jaren om zijn, moet hij een boete betalen op iedere koe alzoo onttrokken. De melk moet in een reine en onvervalschte conditie geleverd worden, zonder eenige onaangename smaak. De leden zijn verplicht de melk koel te houden als het niet dadelijk afgehaald wordt na het melken plaats gehad heeft. Als twee maal gemelkt wordt moet het niet door elkaar gegooid worden. De melk van eene pas gekalfde koe mag niet aan de Zuivel zaak geleverd worden voor drie dagen verlopen zijn. De melk van eene koe lijdende aan eenige ziekte mag slechts geleverd worden op vertooning van een certificaat van een Veearts. In geval een aanstekelijke ziekte uitbreekt, mag geen melk van een alzoo besmette plaats geleverd worden. Melk die zuur of vervalscht is of bij de Roomerij komt in kannen niet heelemaal schoon wordt geweigerd. Regels zijn neergelegd omtrent de hoeveelheid voer te worden gegeven aan elke koe in den winter, en, gebeurt het dat zeker soort voer de kwaliteit der boter bij de Roomerij benadeelt, heeft het Comité het recht te eischen dat gemeld voer niet meer gebruikt zal worden. Niettegenstaande deze en andere strenge restricties, is het allerbelangrijkst kenmerk in elke co-operatieve zaak in Denemarken de buitengewone getrouwheid aan hun eigen instellingen van de menschen die er deelhebbers van zijn.

Denemarken is niet het eenige land waar de meuschen zich vrijwillig onderwerpen aan de restricties hen opgelegd door hunne eigen co-operatieve genootschappen. In Noord Holland hebben de markt tuiniers zich in co-operatieve genootschappen gevormd die ook op een buitengemeen practische voet bestuurd worden. Het goed der leden wordt geïnspecteerd, voor het te koop geboden wordt, door ambtenaren door de genootschappen zelf benoemd voor het doel, en eenige beschouwd beneden het vereischte gehalte wordt geweigerd, terwijl aan het andere dat aangenomen wordt een etiket dragende het geregistreerd handelsmerk van het genootschap gevestigd wordt. Ook zorgt men dat de bezendingen de behoorlijk opgegeven maat hebben en dat zij behoorlijk verpakt zijn. De alsoo goedgekeurde produkten worden te koop geboden op de markt van het genootschap, de marktmeester zijnde gewoonlijk de president van het plaatselijke genootschap of een tak daarvan.

Als een voorbeeld van wat gedaan kan worden door de boeren in Natal met hunne miellie oogsten, kan ik het geval voorstellen, door den heer Pratt aangehaald, van de boeren in Hongarije. De ondervinding



ROYAL AGRICULTURAL SHOW.
Persian Ram,
Exhibited by Central Experiment Farm, Cedara.



toonde hen dat zoolang elkeen op zijne eigen afzonderlijke krachten in het van de hand zetten van zijn graan steunde, was hij onderworpen aan zekere merkbare nadeelen. Vooral was hij aan de genade van eenig kartel (of ring) van koopers dat zich wilde vormen blootgesteld, want zij wisten dat zelfs wanneer hij in staat was zijn oogst terug te houden totdat de prijzen meer gunstig zouden zijn, het practisch onmogelijk voor een boer was, wonende in districten verwijderd van den spoorweg om zijn oogst tot den winter terug te houden, want dan zou hij het niet aan den spoorweg kunnen brengen wegens den slechten toestand der paden. Om dezen toestand te verijdelen, vormden de boeren in vele districten co-operatieve organisaties om elevators op te richten by "sidings" nabij de meest gelegen spoorweg stations en naar deze elevators zonden de boeren hun koorn om geborgen te worden, de afzonderlijke lotten wordende met de andere gemengd doch in het geheel genomen gevoegd slechts bij soorten van gelijke kwaliteit. Door middel van deze elevators konden de beschikbare voorraden voor geruimen tijd gehouden worden. Niet alleen werd de vorige moeielijkheid om ze bij het spoorweg station te krijgen in den winter te boven gekomen, doch de uiteindelijke verkooping bij de groote maat betekende het vervoeren van het koorn over den spoorweg in groote hoeveelheden—waardoor en aanzienlijke uitsparing in de vrachtgelden teweeg gebracht werd wanneer vergeleken met wat elke boer zou hebben moeten betalen als ieder zijn eigen bijzonder lot had weg gezonden als een afzonderlijke bezending. Financieele schikkingen werden terzelfder tijd getroffen waardoor de boeren voorschotten van crediet banken kregen op het koorn door hen gestuurd naar de elevator, en met deze voorschotten voorhanden konden zij op de balans wachten tot zoodanigen tijd als de verkooping tot hun voordeel zou uitvallen. Zoo goed heeft deze verdere ontwikkeling van de combinatie der landbouwers beantwoord in Hongarije, dat men een centrale organisatie uitdenkt met het opzettelijk doel om de oprichting van co-operatieve elevators in al de koorn bebouwende districten van het land aan te moedigen en te vergemakkelijken.

Een treffend voorbeeld van wat op eene kleine schaal gedaan kan worden, wordt geleverd door het Muskham (Notts.) Co-operatieve Landbouw Genootschap. In dit dorp werd in 1899 deze organisatie begonnen met zeven leden en een secretaris, en verscheidene maanden verliopen voor het ledental aangroeide. Aandeelen van 5s stuk werden uitgegeven waarop 1s 3d opgeroepen werd. Net voor den oogst van 1899 besloot het genootschap een maai en bind machine voor £32 te koopen (hoewel het opbetaalde kapitaal slechts £15 bedroeg) en de leden kregen een voorschot van de plaatselijke bank door zich gezamenlijk zoowel als ieder afzonderlijk verantwoordelijk voor de terugbetaling te houden. Een schaal van prijzen voor het gebruik van de machine werd opgesteld en de ontvangsten sedert waren voldoende om de leening te betalen zoodat

de machine thans het eigendom is van het genootschap, en de verdere ontvangsten daarop zijn, na aftrek van slijtage kosten, zooveel profijt.

Wanneer co-operatie op deze kleine schaal eenmaal ingesteld wordt, blijken de voordeelen daarvan zoo duidelijk dat zij zich speedig uitbreidt en voor andere doeleinden gebruikt wordt.

Het is een hoofdregel bij alle co-operatieve genootschappen, in welk land zij ook gevonden worden, dat de politiek en geloofszaken uitgesloten moeten blijven. Inderdaad, deze co-operatieve societeiten zijn het middel geweest om leden van tegenovergestelde politieke partijen en van verschillende geloven, tusschen wie er vroeger strijd en vijandschap bestonden, op vriendschappelijke voet te brengen. In België en in Italië zijn deze genootschappen krachtig aangemoedigd en gesteund door de Roomsche Katholieke predikanten als een tegengift—en dat een zeer doeltreffend tegengift—tot Socialisme.

Co-operatie kan op talloze doeleinden toegepast worden, waaronder de aankoop van mesten, aankoop van stoom dorsch machines, verkoop van vee, verkoop van graan, veeteelt, paardenteelt, eierproductie en pluimveeteelt, maken van jam, stoomploegen, vruchten kweken en verkoopen, molens, verbetering van trekpaarden, uitgeven en bebouwen van kleine perceelen, bijenteelt, vlas, kaas, boter, enz. maken, landbouw nijverheden, aankoop van zaad, aankoop van landbouw gereedschap; en vele co-operatieve genootschappen werden opgericht alleen om de goederen bij de groote maat te vervoeren ten einde het voordeel te genieten van de lagere prijzen voor truckvrachten, zoowel als co-operatie om samen goederen te koopen terzelfde tijd met hetzelfde oogmerk.

De kern van een landbouw genootschap bestaat reeds in elk district van Natal in den vorm van de plaatselijke boeren vereeniging of klub; eenige inlichting die zoodanige boeren vereeniging of klub vereischt, voor een klein co-operatief genootschap in het leven geroepen wordt, kan verkregen worden op aanvraag bij het Landbouw Departement, Maritzburg; en mocht de co-operatie waartoe, zoodanige boeren vereeniging of klub besluit, vorm nemen of eene onderneming worden, waarvoor financieele hulp bij wijze van eene leening voor kapitaal doeleinden vereischt wordt, machtigt de Landbouw Ontginnings Akte van 1904 de Regeering, door middel van de Land Commissie, om het noodige geld voor te schieten. De secties betrekking hebbende op leeningen om landbouwers te helpen co-operatieve zaken daar te stellen zijn als volgt:—

56. De Commissie kan, met goedkeuring van den Gouverneur in Rade, landbouwers behulpzaam zijn in de oprichting van fabrieken of dergelijke zaken bedoeld voor het maken van zuivel en boerderij produkten, zooals, boter, kaas, en tabak, of het verpakken en bewaren van vruchten, of eenige andere fabrieken voor het beter gebruik maken of verkoopen van rauwe producten.

57. Geen schema voor eenige zoodanige onderneming zal goedgekeurd worden tenzij het opgericht en voortgezet wordt door eene vereeniging van de soort bekend als een co-operatieve vereeniging, noch voor de constitutie en de

regels van zoodanige vereeniging aan de Commissie onderworpen en door haar goedgekeurd werden.

58. De regulaties onder deze Wet kunnen voorschrijven de voorwaarden waaraan voldaan moet worden voor eenige vereeniging de goedkeuring der Commissie kan erlangen, hetzij ten opzichte van hare samenstelling, lidmaatschap, of verantwoordelijkheden, de distributie der profijten, of eenige andere zaken hoe ook genaamd in verband met hare constitutie.

59. De hulp te worden verleend door het Gouvernement zal zijn bij wijze van eene contributie tot de kapitaal onkosten, en zoodanige contributie zal gemaakt worden op zoodanige termen van betaling, terugbetaling en anderszins als der Commissie behoorlijk voorkomt.

En nu, om de vraag te beantwoorden waarmee dit artikel aanving: "Wat is de beste vorm van landbouw co-operatie voor Natal?" Klaarblijkelijk is het antwoord in 't kort: "Die welke van zelf ontstaat binnen eenig bijzonder district om de bijzondere vereischten dergenen die co-opereeren te gemoet te komen."

Omtrent "hoe te co-opereeren?" moet allereerst de les geleerd worden wat men *niet* moet doen. Verlaat u niet op, en wacht ook niet op het Gouvernement om een co-operatief genootschap voor u in 't leven te roepen, begin er zelf mede, het komt er niet op aan op hoe klein een schaal—inderdaad hoe minder grootsch de doeleinden des te meer waarschijnlijk dat gij zult slagen en dat het u vertrouwen zal imboezemen om later op iets meer ambitieus in te gaan. Wacht niet tot gij allen—of bijna allen—in uw district kunt krijgen om samen te maken; maar maak een begin zoodra er twee of drie van u samen gekomen zijn, in de overtuiging dat zij die terug houden zullen aansluiten, zoodra zij zien dat er werkelijk iets gedaan wordt, om toch niet buiten in de koude gelaten te worden. Onderneem niets vooreerst dat niet gemakkelijk door uzelfen beheerd kan worden en waarover gij niet gedurig opzicht kunt houden. Wanneer gij voelt dat gij op de been zijt en geleerd hebt met vastheid langs den weg van co-operatie te wandelen, zult gij u spoedig kunnen wagen op verdere en meer gevaarlijke expedities.

En omtrent "wat te ondernemen" zou ik in de eerste plaats aan de hand geven:

- (a) Co-operatie om te zorgen dat bezendingen van producten of levende have, uit eenig distrikt te vervoeren, het spoorweg station te gelijker tijd zullen bereiken zoodat zij te zamen truck vrachten zullen uitmaken, en men, dientengevolge, het voordeel van truck vrachtprijzen kan genieten.
- (b) Co-operatie om te zorgen dat goederen of levende have elders gekocht door de boeren van eenig gegeven district geleverd zullen worden terzelfder tijd en terzelfder plaatse, ook met het doel om truck vrachtprijzen te verzekeren.
- (c) Co-operatie om gezamenlijk mesten, zaad, of landbouw

gereedschap aan te koopen, zoodat men direct met de fabrikanten kan handelen en dus het voordeel van de prijzen voor groote bestellingen kan verkrijgen. (Dit is een vorm van co-operatie die reeds in Natal bestaan heeft.)

- (d) Co-operatie voor de plaatselijke verzameling en den verkoop van mielies aan het Gouvernement met het oog op Gouvernements kontrakten. (Thans gebeurt het dikwijls dat geen plaatselijke tenders door het Gouvernement ontvangen worden voor de levering van mielies in mielie bebouwde districten, en dat het Gouvernement verplicht is de tender van een tusschen-handelaar op Maritzburg aan te nemen; hetgeen beteekent dat de commissie of profijt van den tusschen-handelaar en de spoorvracht van het district naar Maritzburg en terug naar het district bij de kosten der mielies gevoegd moeten worden. Een combinatie van plaatselijke groeiers kon dus makkelijk tenderen tegen een prijs die voor de leden daarvan beter betalend zou zijn dan die van den tusschenhandelaar ontvangen, en toch tegen een cijfer dat den tusschen handelaar zou uitsluiten.)
- (e) Co-operatie voor de opberging van mielies in tanken of graanhuizen, om niet gedwongen te worden op een ongunstige markt te verkoopen.
- (f) Co-operatie, in melk opleverende districten, tot oprichting van zuivel fabrieken, of—waar de onmiddellijke aanleg van zoodanige fabriek haast niet te rechtvaardigen of te gewaagd is—tot het daarstellen van tijdelijke room afscheidende stations, waarvandaan de room alzoo afgescheiden verkocht en gestuurd kan worden aan een van de grootere zuivel fabrieken.
- (g) Co-operatie, in vruchten groeiende streken, tot verzameling en gelijktijdig wegzending, in gelijke perceelen, van vruchten om de kosten der vracht te verminderen; ook voor de oprichting van fabrieken om vruchten in te leggen en jam te maken.
- (h) Co-operatie, in pluimveeteelt kringen, voor de verzameling, het sorteeren en het gelijktijdig vervoeren van eiers in een groot rooster in plaats dat elk boer, zooals thans, zijn eigen kleine bezending bezorgt.
- (i) Co-operatie voor de oprichting van zaken tot bereiding van ham en spek.

Bijzonderheden ten opzichte van eenige dezer voorgestelde vormen van co-operatie zullen, als tevoren gezegd, gereedelijk verschaft worden op aanzoek bij het Departement van Landbouw, Maritzburg.

Experiment Farms.

CEDARA.

To DIRECTOR EXPERIMENT STATIONS.—

The weather has been exceptionally cold throughout the whole month of June, and the fact of having frost registered on twenty-four different dates also points to the low temperature that has been prevailing. Twelve degrees of frost were registered on several occasions, and the mean for the maximum readings was 66 degrees.

The veld is completely brown and dried off, affording little or no grazing for the working cattle, thus necessitating daily attention to the hand-feeding of them. This is being done by carting mealie stover and grass hay (which has been well sprinkled with diluted treacle), to one of the paddocks, and feeding it from hay-racks that have been recently constructed by the students.

Since the opening of the Farm, which is now close on five years, the working oxen, of which there have been only a limited number, have been kept practically at work daily without a rest. The ordinary routine of field labour has formed only a very fractional part of the work they have done. They have been employed bringing material for the great number of buildings that have been erected, and for transport purposes in connection with other works, particularly the permanent water scheme. It will therefore be readily understood that the oxen are almost worn out, and very difficult to keep in condition in spite of careful feeding.

Ploughing has been continued on cultivated land as well as in the breaking up of veld in one of the paddocks.

Preparatory to having the College grounds laid out as a landscape garden, a portion in front of the building has been broken up. It will thus be benefited by the weathering influences of the winter months, and rendered fit for re-ploughing and cultivation in the early spring.

A gang of convicts is being kept busy digging drains on the vlei. This work is being pushed on with as little delay as possible in order that the ground may be brought into a suitable condition for cultivation early in the spring, having in view your desire to cultivate the vlei land for the coming season's experiments.

The main drains are in the meantime to be open, but lateral drains leading into them will be opened with the mole plough or tiled with pipes, stone, timber, etc., and covered so that there may be no waste of ground and obstruction in cultivation.

The Engineer has been engaged in removing the windmill (that was originally erected for the temporary water supply of the Farm) to the site adjoining the main entrance, where it is erected, to be utilised in

pumping water from the spruit to a reservoir which is in course of construction. The work has been so far carried out by students, guided by instructions given in your course of lectures on irrigation and drainage. The vegetable garden will then be conveniently irrigated from the reservoir.

The Carpenter has completed the poultry houses and runs. The next important work awaiting his attention is the removal of the pig sties to a more suitable site, where paddocks of feeding crops are being organised.

The Storekeeper has had an exceptionally busy month in preparing an annual stock return of seeds on hand (this has already been handed to you): further in getting up an exhibit of winter stock feeds, and samples of rations, etc., for the Maritzburg Show, as follows:—Veld hay (baled), millet hay (baled), stover (baled), silage, six different rations for milch cows, thirty varieties of beans, turnips, swedes, carrots, kale, flax, bullrush millet, bullrush millet meal ground in three grades, white soy bean meal ground in three grades, green soy bean meal ground in three grades, mealie meal ground in three grades, mealie pollard, and mealie bran.

From the flock of Persian sheep, two rams and two ewes were exhibited at the Show. A few of the important implements in use on the Farm were also shown, viz., kraal manure distributor, silage cutter and blower, buck-eye seed and manure drill, husker and shredder, and harvester and binder. In order that the husker and shredder could be seen at work to advantage a quantity of mealies (stalks and cob) were provided for the purpose of practically demonstrating the working of the implement. Power was kindly supplied by Messrs. North & Son, who occupied the adjoining site. Judging by the number of spectators who witnessed the operation, it seemingly proved of interest to many farmers, and quite justified the labour of having it shown.

The vegetable garden has been receiving a good share of attention; it is being extended and also receiving deep cultivation. Celery, onions and asparagus have been transplanted from seedlings forced in hot-beds; rhubarb planted and sowings of peas at intervals.

The poultry section is now in full swing, and a further purchase of four Silver Wyandottes has been made. The White Leghorns have commenced laying. An incubator has been secured, and it is intended to be in use early in July.

I have to report generally on the satisfactory progress that is being made by the students, who, as usual, have been employed in their turn at the various branches of work.

Mr. Gessner, who has been transferred from the Winkel Spruit Station, arrived here on the 28th.

I attended the Estcourt Show on the 21st.

ALEXANDER REID,

Farm Manager.

ORCHARDIST. CEDARA.

REPORT FOR HALF-YEAR ENDED JUNE 30TH, 1907.

I have very little of importance to place before you. Few of the trees have reached the bearing stage. A few peaches of Dr. Hogg variety were gathered. Though rather small, they were of good flavour. A few very fine Wickson plums were also gathered. All the trees in the Western Orchard except pears are making satisfactory growth. Some varieties of pears are making little or no growth; they require a more vigorous stock. Trees in the Eastern Orchard are not making quite the same satisfactory growth. They are growing in a more exposed position, with poorer soil; and have been unfortunate enough to get the full force of hailstorms.

The buck have been very troublesome all summer, and if not kept severely in check now they will become a nuisance owing to the amount of cover about.

Practical demonstrations were given to the students during the season. The percentage of "takes" in budding fruit trees will be reported on later.

The heavy thunderstorms did a considerable amount of damage by washing the hillside soil into the vleis. Leguminous crops will be planted this year between the rows of trees to prevent the wash in future. One hailstorm was recorded on the 28th of March, but not nearly as severe as the 1906 storm, although heavy enough to smash all windows on the storm side.

Mr. Taylor, my assistant, was transferred to the Forester on the 25th March at his own request; and Mr. Parsons, from the Hex River Orchard Company, was engaged, and is proving in every way satisfactory. I hope the Department will give him every encouragement to stay in the Service.

Very little planting will be done this year, except to fill in vacancies. The Nursery is well filled with various kinds of young trees, mostly propagated by the students, and will be used in future plantings.

The present stock of animals consists of one mare, two foals, and six oxen. Four more oxen are required to work the place satisfactorily. About 20 acres of fair mealies were reaped.

STRAWBERRIES.

Strawberries did fairly well, notwithstanding the heavy rainfall. In all 1,100 lbs. were gathered from plots planted at different times and treated with various kinds of manures.

The accompanying table will show results from nine manure plots of 500 square feet each, planted on the 21st November, 1905. The results I consider very satisfactory from the first year's crop, and clearly show the importance of superphosphate over sulphate of ammonia. The plots will be manured on similar lines for two more years, and the re-

sults I expect will be more marked in the succeeding years. The difference between Plot 5, yielding the heaviest crop, and Plot 3, with no manure, is 985 lbs. in favour of the manure, or, at the selling price of 6d. per lb., would be £24 12s. 6d., against £1 7s. 6d., the cost of manures.

This year should demonstrate the merits of some 30 varieties in stock. So far President Slachter stands an easy first as an all-round good strawberry, but, strange to say, I have had very poor reports of it from people that were supplied with trial lots. Next on the list come Noble, British Queen, Gunton Park, the Laxton, Laxton's Leader, and Competitor. These have all done well here, but are inclined to be a shade soft for marketing.

Hybridising will be taken in hand next season.

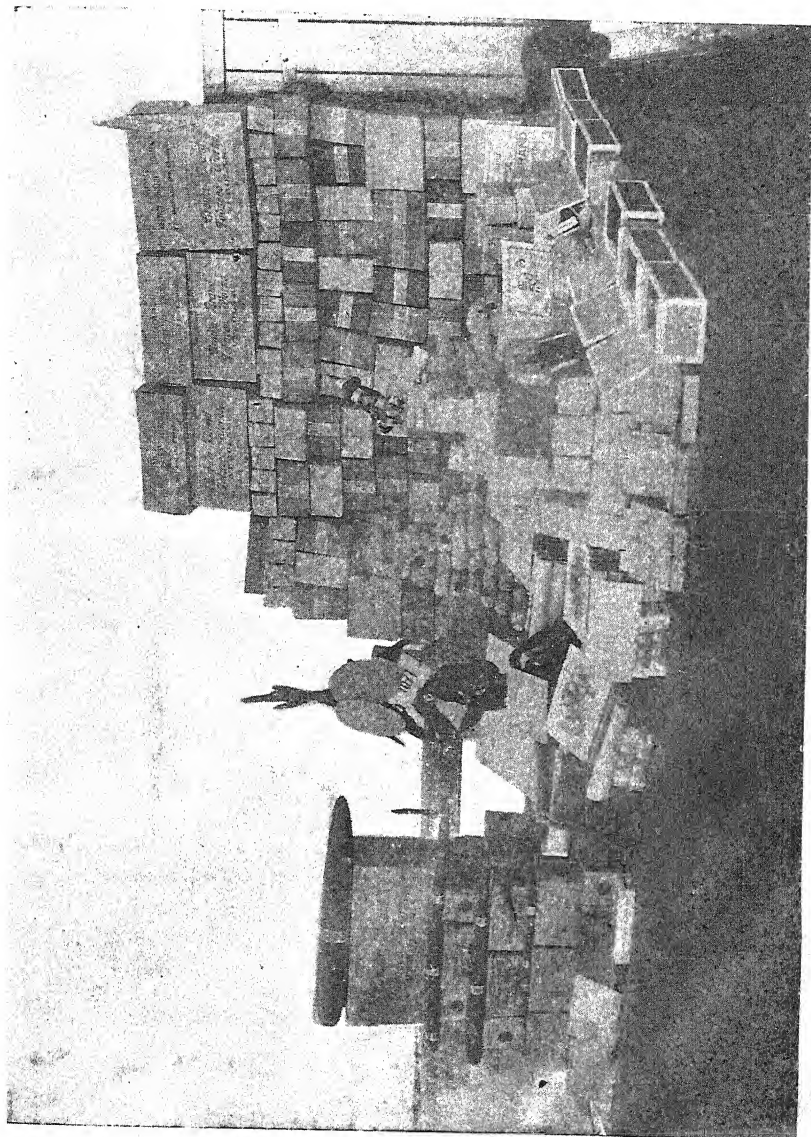
MANURE EXPERIMENTS WITH STRAWBERRIES.

First Year's Results.

Plot.	Kind of Manure.	When Planted.	Rate per Acre.	Cost of Manure.	Gain due to Manure.	Value per Acre at 6d. per lb.
			lbs.	£ s. d.	lbs.	£ s. d.
1	N.	21st Nov., 1905	2,198	1 16 3	412	54 19 0
2	N.P.	"	2,281	2 15 0	495	57 0 6
3	No Manure	"	1,786	...	...	44 13 0
4	N K	"	2,145	2 10 3	359	53 12 6
5	P.K.	"	2,771	1 12 9	985	69 5 6
6	P 2.	"	2,711	1 17 6	925	67 15 6
7	N.P.K.	"	2,570	3 9 0	784	64 5 0
8	P.	"	2,678	0 18 9	892	66 19 0
9	Bones	"	2,537	0 16 6	751	63 8 6

Cost of Manures, per Hundred Pounds.

Sulphate of Ammonia	...	...	s. d.
Muriate of Potash	...	...	15 6 per 100 lbs.
Superphosphate...	...	...	14 0 "
Bone Dust	...	...	6 3 "
			5 6 "
P. Superphosphate	...	...	300 lbs. per acre
K. Muriate of Potash	...	...	100 "
N. Sulphate of Ammonia	...	...	300 "
Bone Dust	...	...	300 "



ROYAL AGRICULTURAL SHOW.
A Fine Exhibit of Tobacco : Shown by Messrs, B. L. and J. Wides, Verulam.

MANURE EXPERIMENTS WITH STRAWBERRIES, PLANTED 21-11-05.

Plot 9, Section 11, E.O.

When Gathered.	N. I.	N.P. II.	No Manure III.	N.K IV.	P.K. V.	P. VI.	N.P.K. VII.	P. VIII.	B. IX.
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
27th Oct., 1906	0 8	..	0 4	0 4	0 4	0 7	0 7	0 7	0 5
31st	0 9	0 3	0 4	0 4	0 5	0 5	0 4	0 7	0 6
5th Nov., ..	0 9	0 5	0 3	0 4	0 3	0 3	0 6	0 7	0 6
9th	1 14	1 2	0 10	0 13	0 8	0 4	0 10	0 2	0 12
14th	1 14	1 0	0 12	1 0	1 3	1 14	0 11	1 6	1 6
16th	0 10	0 10	0 7	0 10	0 7	0 5	0 6	0 9	0 10
21st	1 7	1 5	0 12	1 3	1 5	0 14	1 4	0 15	1 7
24th	0 11	1 2	0 15	0 12	1 2	0 15	0 13	0 15	1 1
29th	1 7	3 1	2 2	3 1	3 13	4 1	3 5	3 0	2 12
3rd Dec., ..	1 3	2 4	1 4	2 4	3 0	2 4	2 9	2 1	2 5
5th	0 2	0 4	0 4	0 8	0 14	0 12	1 0	0 13	0 15
7th	0 2	0 2	0 2	0 2	0 4	0 1	0 4	0 3	0 2
12th	0 14	1 8	1 6	1 4	1 11	1 7	1 13	1 11	1 7
19th	1 3	1 5	1 5	1 13	1 10	1 12	2 0	1 14	1 15
23rd	1 8	1 9	1 3	1 0	1 6	1 8	1 4	1 8	0 9
28th	2 14	1 11	1 7	2 1	2 0	1 14	1 9	2 8	2 8
3rd Jan., 1907	1 5	1 5	1 9	1 11	2 13	2 12	2 6	2 11	2 11
9th	2 0	1 14	1 1	1 8	2 5	2 15	2 9	2 3	2 3
14th	1 1	1 7	0 15	0 14	1 6	1 9	1 6	1 9	1 0
22nd	2 3	2 8	2 1	2 0	3 7	3 2	2 6	3 0	2 14
25th	1 4	1 10	1 10	1 6	1 15	1 14	2 4	2 7	1 8
Totals ...	25 4	26 3	20 8	24 10	31 13	31 2	29 8	30 12	29 2

CAPE GOOSEBERRIES.

Cape gooseberries were a heavy crop, and would pay well if one could depend on markets. The yield per acre was 3,726 lbs. with a dressing of 400 lbs. superphosphate; and the cost to gather is about £1 7s. 6d. per 2,000 lbs.

BRAMBLES.

Brambles will also do well here; 88 lbs. of fruit were gathered from 90 small two-year-old bushes. A few plants of dewberries received from Sir Henry Bale had fruit $1\frac{3}{4}$ inches long this season. The varieties that have done well are Wilson's Early, Snyder, Childs, Erica, and the Japanese wine berry.

RASPBERRIES.

Raspberries have given no return yet. The only variety that we have in quantity is Golden Queen, and it has turned out a failure here, dying down to the ground each year owing to the canes not being sufficiently ripe before the frost sets in. The same has happened this year. I would suggest giving it a trial for another year, and if it does not give a better account to root them all out. There are in stock small lots of several varieties that are promising better.

SALES.

£28 17s. 11d. worth of fruit was sold during the season, and £8 12s. 9d. worth supplied to the School of Agriculture for making jam.

F. ANDERSON,
Orchardist.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

During the month attention has been paid to irrigating the various crops, viz., oats, wheat, barley, rye, lucerne, and peas. A fine mulch has been kept on the land through continuous working of the anti-clog weeder and a set of light harrows. The latter operation I consider most essential to the successful growth of the various crops, especially on irrigated land. But when looking around on other lands very little is done in the way of cultivating (except in isolated cases) to conserve the moisture already in the ground, which would minimise the work of irrigating; as an alternative, the land is continually being swamped by the application of water, and all the most valuable elements of the soil suffer in consequence.

The bag of wheat (Standard Fife) which I received from the Central Experiment Farm, Cedara, has been planted, and is making fair growth although sown a month later than the 12 other varieties mentioned in a previous report.

Approximately, two acres of land, which were prepared during the

last month, have been sown with six varieties of peas, viz., York Hero, May Flower, King Edward VII., Pride of the Market, Gradus, and Telephone, and valuable comparative data should be secured.

The work of cutting the main drain across the lower end of the Block has been attended to when labour was available. Approximately 100 yards have been excavated, to an average depth of four feet.

As it is your intention that tobacco will be the principal crop grown next summer, I would suggest that some suitable fodder be planted to serve as a windbreak along the boundary fences and various sections. Yuba cane would not only be useful for the above purpose, but would also supply a quantity of succulent fodder for the working cattle throughout the year; if two rows were planted, say, 4 feet apart, one row could be cut for fodder and the other would serve as a windbreak.

The student stationed here left on the 25th June to take his examination papers at the Agricultural College, Cedara, and returned again on the 1st July.

All live stock are healthy.

W. HOSKING,
Curator.

The Orchardist, Weenen, reports as follows for the months of May and June:—During the month of May I had all the beans reaped and thrashed, 13 bags in all, 11 of which, weighing 2,485 lbs., I sent you on the 10th June. I also had the mealies shelled, which gave 6 muids.

The rest of May was taken up in cultivating, etc.

During the month of June Sections 1 and 2 were irrigated, ploughed, and cross-ploughed, and the Citrus Sections also irrigated and ploughed, and part planted with peas. The mealie stalks were all removed from Off-section 4 and the land ploughed. I have marked out all the different sections with jarrah pegs, on which I have stencilled the names of the different varieties for the benefit of visitors. Section 5 (cultivated only enough to keep down weeds) has been hand-hoed. The whole of the orchard has been gone through with the hoes and all weeds removed.

A few very heavy frosts have occurred during the month, which have bitten some of the citrus and guava trees badly. Some varieties of citrus trees, such as the East Indian lime and a few others, have been quite killed, while others have hardly been affected. With the East Indian lime and a few others, the bark has cracked and dried up, leaving the wood exposed. The pear-shaped guava has suffered badly, although the same trees stood all through the winter last year. The Red China has not been so badly affected.

I have had all the raspberries earthed-up and the canes bent over and pinned to the ground. The varieties of strawberries planted 1st May are not doing very well, although frequently watered and cultivated. I think the reason for this is that they were planted a little too late and did not get sufficient root hold before the heavy frosts set in. Some

President Slachter strawberries planted only about a week before the other varieties have done much better under the same conditions. The President Slachter strawberries planted 15th March have done splendidly and are now well established plants. March so far seems about the best month for planting out strawberries.

On an average, five hands were employed during the month.

T. R. M. POLE,

Orchardist.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

Although the rainfall for the year ending June 30th was a heavy one, we are sadly in need of a downpour at present, as only .22 inch was registered in June. The veld is beginning to look very dry, but so far none of the crops show any signs of the want of moisture.

The section of new land which was cleared of bush and broken up late last year and planted with maize on January 14th as a manure experiment has been harvested. The yields vary a great deal and show a distinct improvement where chemical manures have been used. Following are the tabulated results:—

TREATMENT OF NEW GROUND.

Rows 5 Feet Apart.

Plots.	Manures, per acre.	Yield in Cobs.	Yield in Grain.	Muids per acre.
		lbs	lbs.	
A	Lime, 2,000 lbs.	213	142	3.181
B	Check Plot—no manure	214	143	3.186
C	Kraal manure, 14 tons	204	136	3.146
D	Wood Ash (burned on land), 5 cwt.	396	264	7.52
E	Gypsum, 350 lbs.	388	259	7.24
F	Check Plot—no manure	412	275	7.112
G	Concentrated Superphosphate, 80 lbs.	743	495	13.122
H	Basic Slag, 200 lbs.	679	453	12.91
	Nitrate of Soda, 100 lbs.			
	Gypsum, 300 lbs.			

Plot G (where concentrated superphosphate only was used) stood out very conspicuously from the other plots, the plants maintaining from their early stages a dark green healthy appearance. This plot was commented upon by several visitors, including prominent agriculturists.

One row of red Natal beans was planted between each two rows of maize when nearing maturity, and there is every promise of a good yield. Pig feeding experiments were continued till the 15th of June on the peanuts, and were then removed to sweet potatoes. Following are the results to date:—

PIG FEEDING EXPERIMENTS.

Nos.	Date.	Weight	Date.	Weight	Date.	Weight	Date.	Weight	Date.	Weight	Date.	Weight
	1907	lbs.	1907	lbs.	1907	lbs.	1907	lbs.	1907	lbs.	1907	lbs.
1	May 18	52	May 25	59	June 1	64	June 8	68	June 15	74	June 22	86
2	Feed—Peanuts only.	52	Feed—Peanuts only.	59	mealie meal each.		63	68	mealie meal each.		73	84
3		30		35			40	44			48	61
4		54		62			69	75			79	102
5		41		46			48	51			52	62
6		44		53	1 lb. mealie meal each.		59	65	1 lb. mealie meal each.		69	83
7		38		43	1 lb. mealie meal each.		49	54	1 lb. mealie meal each.		62	72
8		46		53			60	66			69	82
9		43		49			55	59			64	75
10		33		37	Feed—Peanuts and		43	50	Feed—Sweet potatoes &		54	63
11		36		43			47	53	1 lb. mealie meal each.		55	65
12		46		56			64	72			79	92
Totals		515	...	595	...	661	...	724	...	778	...	927

My assistant has been transferred to Cedara, and two students have arrived here from Cedara.

All hands are busy cleaning land and thrashing cane.

W. JOHANSEN,

Manager.

STANGER EXPERIMENT STATION.

SECOND REPORT.

We publish hereunder a report by Colonel Addison, chairman of the committee, on the work of the Agricultural Experiment Station at Stanger. That locality is to be congratulated upon having a resident who so willingly and ungrudgingly gives time and attention to this Experiment Farm. It is understood that he visits it almost daily; and to a busy man like Colonel Addison the supervision he gives to the Farm and to the preparation of the reports must make a considerable encroachment upon his time. Unfortunately, judging from the remarks at the commencement of the report, his enthusiasm is not shared to anything like the same extent by others of the district upon whose interest the Farm has a claim:—

I regret that no report was sent in for the year ending December, 1905. The present report, however, comprises two years' working of the Experimental Farm ending with December, 1906.

I regret that little interest has been taken either by the public, or the Victoria County Association, in this institution, and that I consider the expenditure of public money for the further upkeep of the Farm is hardly warranted.

To be of interest the present report should be studied and compared with the first report, as experiments which had been commenced have in this report been matured. The results will be shown later on. I have selected some of the most interesting and useful experiments for demonstration. These are the results of cane experiments with fertilizers, experiments in cultivation without fertilizers, experiments with leguminous crops planted as fertilizers, planting at different seasons and months, cane fertilized by one or more applications of manure, planting at intervals and distances, and canes planted from selected sets.

EXPERIMENTS IN DISTANCE PLANTING.

Uba Cane.—Twelve plots planted, rows from 4 feet 6 inches to 8 feet apart, interval between sets 3 feet. The best result in weight of cane was from Plot No. 105: rows 7 feet apart and sets 3 feet apart. Yield from this plot equal to 72,312 lbs. of cane to the acre.

Natal Cane.—Plot 117, rows 7 feet apart, and sets 3 feet apart. Yield equal to 45,575 lbs. to acre. These plots were fertilized with concentrate superphosphate at the rate of 200 lbs. per acre.

Vigour sets or selected plants, 200 lbs. concentrate superphosphate to acre. *Uba Cane* yield from Plot 121 equal to 66,400 lbs. of cane to acre.

Vigour sets *Natal Cane*, 200 lbs. concentrate superphosphate to the acre.

Plot 123, yield equal to 30,462 lbs. to acre. It will be seen from these experiments that the distance planting yielded better than the vigour sets. There probably was very little difference in the quality of sets in each case, and the result shows the decided advantage of air and light.

EXPERIMENTS WITH FERTILIZERS.

Canes: Natal, Uba and Lousier.

UBA CANE.

No Manure Plot, yield equal to 68,000 lbs. of cane to acre.

Plot 82, yield equal to 82,662 lbs. to acre. Fertilized with 19 lbs. 4 ozs. sulphate ammonia, 9 lbs. 10 ozs. double superphosphate, 8 lbs. chlor. potash, 90 lbs. lime to the plot (2-25ths of an acre).

Plot 84, yield 80,462 lbs. to acre. Fertilizers: 9 lbs. 10 ozs. double superphosphate, 90 lbs. lime to 2-25ths of acre.

Plot 79, yield 75,775 lbs. to acre. Fertilizer: 24 lbs. bone dust to 2-25ths of acre.

Plot 78, yield 76,562 lbs. to acre. Fertilizer used, 24 lbs. basic slag.

NATAL CANE.

No manure plot, yield 26,687 lbs. to acre.

Plot 87, yield 48,600 lbs. cane to acre. Fertilized by 19 lbs. 4 ozs. sulphate ammonia, 9 lbs. 10 ozs. double superphosphate.

Plot 85, yield 37,800 lbs. cane to acre. Fertilized by 19 lbs. 10 ozs. sulphate ammonia, 9 lbs. 4 ozs. superphosphate, 8 lbs. chlor. potash.

LOUSIER CANE.

No Manure Plot, 22,217 lbs. to acre.

Plot 94, yield 38,860 lbs. to acre. Fertilized by 9 lbs. 10 ozs. double superphosphate.

Plot 96, yield 29,650 lbs. to acre. Fertilized by 24 lbs. basic slag.

All the above plots are 2-25ths of an acre.

It will be seen by these experiments that the application of phosphates has resulted in better yields. Worked out on a money basis, however, the cheaper superphosphate in the shape of bone dust and basic slag would give the larger profit.

EXPERIMENTS WITH BASIC SLAG

Applied at Intervals during Growth of Cane.

Four plots each of Uba and Natal cane planted in plots of 1-20th of an acre each.

UBA CANE.

Plot 31 (No Manure): yield, 4,119 lbs. per plot.

Plot 30: one dressing of 25 lbs. basic slag, two months' planting: yield, 4,175 lbs. of cane.

Plot 29: one dressing at 2 months, one dressing at 6 months—25 lbs. basic slag each dressing: yield, 4,438 lbs.

Plot 28: 25 lbs. at 2 months, 25 lbs. at 8 months, 25 lbs. at 14 months: yield, 4,647 lbs.

NATAL CANE.

Plot 32 (No Manure): 3,632 lbs. per plot.

Plot 33: dressed same as No. 30—yield, 3,739 lbs.

Plot 34: dressed same at 29—yield, 3,939 lbs.

Plot 35: dressed same at 28—yield, 3,830 lbs. This was an outside plot and suffered from pilfering during disturbances.

The conclusion drawn is that it is of advantage to apply frequent dressings, but whether the increased yield would pay for the labour expended is questionable.

DATE OF PLANTING.

A plot has been planted each month, commencing with August and ending with February. These plots will be cut and weighed next October. At present the October planting looks best, followed by November. February's cane looks remarkably well. Four varieties of cane have been planted, Green Natal, Ribbon, Uba, and Lousier.

VARIETIES.

Twenty-five plots of 1-20th of an acre have been planted from various sorts of cane collected from estates and nurseries in the country. These canes have been cut and weighed as under:—

Lousier, 2,726 lbs.; Lousier Sport, 1,345 lbs.; Tamarind, 1,874 lbs.; Gold Dust, 2,305 lbs.; Ribbon, 1,304 lbs.; Bois Rouge, 1,842 lbs.

Eight varieties received from nursery at Zwolle. The numbers of these canes were lost, and I have not been able to get them recognised. The yield from these ranged from 1,411 lbs. to 3,236 lbs. per plot of 1-20th of an acre.

Plot of 15½ acres, revenue crop; also experiment in cultivation with cow-pea. This land was ploughed in 1904, and planted with catch-crop of cow-pea and mealies; and again ploughed, harrowed, and planted with cane in October, 1905. Will be ready for cutting next October. The results of the mechanical condition of the soil and the advantages of the cow-pea as a fertilizer are very apparent. Results will be published when this plot is reaped.

Plot 1½ acres cultivation: Florida bean. The land was ploughed, and lay fallow in 1904; ploughed and planted with Florida bean in 1905; and planted with cane in 1906. Looks very promising.

BOONE COUNTY MAIZE.

No Manure Plot, 1-20th acre, yielded 94 lbs. grain.

Plot 26: yield, 125 lbs. grain. Fertilized with 40 lbs. high-grade superphos., 8 lbs. muriate of potash.

Plot 22: yield 100 lbs. Fertilized with 8 lbs. muriate of potash.

MAIZE VARIOUS.

Plot "Yellow Beauty," 1-20th of acre: yield equal to 19½ muids per acre.

Plot "Hickory King": yield equal to 21.3 muids per acre.

Plot "Ladysmith": yield equal to 25½ muids per acre.

These plots received no manure, but were planted after a crop of potatoes, and only got the residue of potato fertilizer.

COTTON.

DAR-ES-SALAAM SEED.

Six plots 1-20th acre each: yield at the rate of 680 lbs. seed cotton, or 227 lbs. clean cotton, per acre.

SEA ISLAND SEED.

Six plots of 1-40th acre: yield at rate of 913 lbs. seed cotton, or 304 lbs. clean cotton, per acre.

Six plots "Riverside," 1-40th of an acre each: yield equal to 746 lbs. to acre, or clean cotton 248 lbs.

CASTOR OIL PLANT.

Matabeleland seed, 750 square yards: yield 95 lbs. of seed.

Seed from Mr. Wilkinson, 4,810 square yards planted: yield, 1,176 lbs.

Indigenous seed: no yield; eaten by birds.

NITROGEN BACTERIA.

Treated seeds—beans, peas, lucerne, cow-peas, winter tares—were sent from Cedara. A plot was planted with each variety of the treated seed and untreated. The results did not show any difference between the treated seed and untreated.

REVENUE CROPS.

Potatoes.—3½ acres, planted 10th August, 1904, yielded 164 muids potatoes; sold in Durban at £125 11s. 4d.—equal to £35 17s. per acre, and a profit of £25 per acre. Eight acres, planted August and September, 1906, yielded 546 muids; sold in Durban for £173 19s.—equal to £21 14s. per acre, and a profit of £11 per acre.

An orchard has been planted consisting of 50 common orange, 50 Victoria orange, 120 avocados, 120 mango, 50 mandarin orange, 50 naartje, 50 peach, 50 papaw, 50 guava, 9 shaddock, 20 grape vines, strawberry, and grenadilla.

One plot of tea planted. Soil seems to be unsuitable; many plants have died.

Pineapples.—The fertilized plots have given good results; some of the pines have weighed 1½ lbs. Common variety quite free from disease or black spots.

RAMIE.

This has been transplanted to a more suitable spot. A considerable number of slips have been sent to farmers in Zululand.

GENERAL.

A windmill and pump was erected last year for the purpose of irrigating the orchard. I regret to state that this is of very little use, as the supply of water is quite inadequate and not up to expectations.

The supply of labour has been plentiful. The number of natives employed has averaged 10 per diem; rate of pay, 1s. 6d. per diem. Food for natives has been supplied from the Farm.

Mr. Webb has given every satisfaction. He has been careful and methodical in his work and records.

I have endeavoured to make the Farm self-supporting, and have so far succeeded that I have applied for a grant of only £200 for the year terminating June, 1908.

I recommend that a cottage for the Manager be erected on the Farm, and that the sum of £300 be expended on it.

Revenue crops will realise between £300 and £350; those of 1908 about £300. The accounts show a credit balance at the end of 1906 of £144 11s.

The balance of the vote, £201 10s. 3d., together with the proceeds of revenue crops sold last year, will give a considerable balance at the end of the financial year June 30th, 1907.

This balance, with the sale of revenue crop of 1907 and the Government contribution of £200, should leave ample funds for working the Farm for 1907 and building a Manager's cottage.

The present value of all crops on the ground is about £500.

If the revenue crops could be increased to 40 acres of cane each year the Farm would be self-supporting.

I attach a statement showing expenditure and receipt from January, 1905, to December, 1906.

FRIEND ADDISON,

Chairman, Experimental Farm, Stanger.

FINANCES.

1ST JANUARY, 1905, TO 30TH JUNE, 1906.

	£	s.	d.		£	s.	d.
Balance in hand as per last Report	182	14	7	Manager	238	0	0
Per Government portion 1904-5				Seeds	40	0	8
Vote	289	18	10	Manures	96	3	10
Per Government 1905-6	500	0	0	Labour and ploughing	392	13	9
Produce sold	196	2	1	General expenditure (including wind mill)	129	15	4
				Balance	272	1	11
	£1,168	15	6				
					£1,168	15	6

1ST JULY, 1906, TO 30TH DECEMBER, 1906.

	£	s.	d.		£	s.	d.
By balance	272	1	11	Manager	70	0	0
Colonial Government (portion of 1906-07 Vote)	198	9	9	Seeds, etc.	92	14	3
				Manures	19	10	10
				Labour and ploughing . . .	123	19	3
				Sundries	19	15	6
				Balance in hand	144	11	10
	£470	11	8		£470	11	8

Jan. 1, Balance in hand . . . 144 11 10

(Since 1st January the balance of the 1906-7 grant has been received, and also some moneys for crops sold. The estimated credit balance at end of June, 1907, is £300.)

H. C. SMITH,
Hon. Secretary.

Laboratory Notes.

By ALEX. PARDY, F.C.S., Analyst.

WATTLE BARK.

Two sample of wattle bark from coast-grown trees were submitted to analysis for the purpose of ascertaining the amounts of tannin they contained at different ages, and also as compared with bark from trees grown inland.

The bark No. 1 was taken from trees 3½ years old, and No. 2 from trees 5 years old. They were shown on examination to contain respectively:—

	No. 1.	No. 2.
Tannins	31.39	33.86
Non-Tannins	10.41	10.67
Soluble Solids	41.80	44.53

A good bark will contain from 35 to 38 per cent. of tannins; a number which have previously been examined have ranged from 28 to 39 per cent., so that, considering the age of these trees, they give promise of a very good return in tannin when a little more matured.

The extract from No. 1 was rather badly coloured and inferior in quality. That from No. 2 was much better in these respects but lacked concentration, a fault which may possibly be remedied by greater age,

There appears to be some disposition on the part of buyers to favour bark grown in certain districts or altitudes, and, in view of this fact, the Department have arranged to receive samples from the various wattle-growing districts from time to time in order to ascertain if there is any apparent difference in the product of the various localities, or any peculiarity which may be attributable to the soil or climate. Should any direct evidence be obtained in this direction, it may be possible to indicate to some extent areas which will produce bark of a superior quality, and thus provide against disappointing results which are discovered only after years of waiting.

Gardening Notes for August.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

MAKE further sowings of Peas for succession, if required. Full crops may be sown of Asparagus, Cabbage, Carrot, Beet, Globe Artichoke, Lettuce, Radish, Turnip, Leek, Onion, and in the warmer districts where late frosts are not to be feared, Tomato, Marrow, Cucumber, Squash, Capsicum, Melons, and Egg-plant. In the colder districts these should be first raised in tins or boxes by means of a hot bed and frame for planting out the following month.

Transplant Onions from the seed beds sown in the autumn. Plant the sets in drills about 9 or 12 inches apart and about 6 inches apart in the drills. In hard, stiff soils it is a good plan to plant the sets in small ridges, so that when the plants are well established the soil may be drawn away from the bulb, leaving it exposed, with the roots only in the ground. A deep, rich loamy soil is the best for this crop, with the addition of lime or wood ash.

The month of August in the midlands is the best time to sow Rhubarb seed. If sown later the young plants do not get sufficient start before the wet weather sets in and are very liable to damp off. The bed should be well raised and edged with tiles or stones as a protection from flooding rains. Rake the surface fine and level and sow the seed evenly and not too thickly, and cover with a thin layer of fine soil; bat down with the back of the spade, and then cover the bed with litter of some kind, half decayed leaves or straw. This must be left in till the young

seedlings show through and then be gradually thinned off as the plants become stronger. Care must be taken not to overwater the bed. These seedlings will produce strong roots for planting out the following spring. The best varieties are Myat's Victoria and Champagne.

Dwarf Beans.—Sowings may be made at regular intervals for succession from August till February.

Plant Jerusalem Artichokes, Asparagus and Rhubarb roots. Rhubarb requires a deep rich soil, well worked and manured well away from overhanging branches of trees. Land sloping towards the south and protected from the north by high ground is the best aspect for this crop.

The planting of deciduous fruit trees should be completed this month if possible, also Grape Vines, Raspberries, Walnuts, Spanish Chestnuts, Filberts, etc.

FLOWER GARDEN.

Hardy Annuals may still be sown from the midlands upwards, such as Pansy, Phlox, Candytuft, Petunia, Mignonette, Coreopsis, Calendula, Larkspur, Gaillardia, Dianthus, Cornflower, etc. Nearer the coast the more tender varieties may be sown, such as Balsam, Nasturtium, Portulaca, Zinnia, Cockscomb, Dahlia, Datura, Amaranthus, etc., including tender climbers, such as *Mina lobata*, Clitoria and Tacsonia; also the various varieties of Ipomea, such as Mexicana and Bona Nox, both having very large pure white flowers, the latter blooming at night; Ipomea Quamoclit or Cypress Vine, small star-shaped flowers in scarlet and white; also the double and single Morning Glories. These beautiful climbing annuals are of a very rapid and luxuriant growth. The flowers will come double, semi-double, and single. The colours vary; there are various shades of blue, white spotted with red, white marbled with purple and lavender, crimson, pure white, etc.

All kinds of perennial border plants should now be planted, such as *Phlox decussata*, Pentstemons, Pinks, Carnations, Cannas, Rudbeckias, Japanese Anemones, Cornflower-Asters, Coreopsis, Gaillardias, Heliotropes, Gladioli, Tube-rose, and the various kinds of Amaryllis and Lily bulbs. In planting Liliums, those having scaly bulbs, the proper depth is of great importance. Many amateurs plant them too shallow. A safe depth is not less than four times the depth of the bulb; should the bulb be two inches high, then the base of the bulb should be eight inches from the surface of the soil.

Some Lilies have only roots at the base of the bulb, others have base roots and stalk roots. The stalk roots are the main support of the plants, so that every encouragement should be given to these; while the roots from the base are working in the interest of the bulb, the stalk roots are working in the interest of the flowers, consequently a top dressing of light rich compost will materially assist this class of bulb.

EDGINGS FOR FLOWER BORDERS.

The Shasta or Ox-eye Daisy and the Pink make the most satisfactory edging for a flower border; both are hardy against heat and cold, retaining their freshness all the year round, and are easily kept within bounds.

Plant out without delay all kinds of deciduous flowering shrubs if not done last month. Both these and evergreen flowering shrubs may be safely planted from tins if the roots are undisturbed.

Correspondence.

LUCERNE CULTIVATION.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—The short article by Mr. Sawyer on the above subject in your last issue is, to say the least, unsatisfactory to me, inasmuch as he does not go far enough, and, in my opinion, the artificial manures chosen were quite the wrong ones for the locality in which these experiments were carried out. What the Weenen man wants to know is: If I have to manure my lucerne, what is the most profitable manure to use and in what quantities? I think nearly everyone knows that the right way to plant lucerne is in drills, and that cultivation is necessary (but not always practised I am afraid), but the right manure I might say no one has yet proved by actual experiment as far as Weenen or similar thorn land is concerned. I am inclined to think that kainit will be the most successful, and certainly nitrate of soda, sulphate of ammonia, and potassium salts should be given a trial; and it is for the purpose of suggesting that these experiments be carried out that I am writing to you. The great thing to discover is the most economical quantity—yet sufficient to get the maximum result with either manure—and when and how to apply it. If, in conjunction with this, the right amount of artificial water (not rain) to be applied can be gauged, an immense boon will be conferred upon all block-holders, who, I feel sure, are at present using a great deal too much water, to the ultimate detriment of their lands.

A description of the grader illustrated would be interesting (it looks home-made), if effective or not, etc., also the price of the rotary Moline mentioned, and the agents.

At the same time, might I refer to Mr. Pardy's article on "Vlei

Soils"? He speaks of ten samples of soil taken from Cedara and six from Weenen, and then gives a tabulated result of seven samples, but gives no clue as to where these samples came from—whether they are Cedara vleilands or Weenen block soil. In fact, here again I do not think the writer has gone far enough, for I was in hopes we should have had an analysis of each, so as to be able to get a comparison of their agricultural values in an intelligible form, but as the article is now I cannot make head nor tail of it, and I am not ashamed to say so.—Yours, etc.,

G. C. WILLIAMS.

Hillcot.

[It is surely a truism to state that a small contribution to our knowledge of the lucerne crop is less satisfactory than a complete treatise would be. All data, as secured, are immediately placed at the disposal of planters, and it is not thought that any useful purpose would be served by retaining same until an exhaustive trial could be compiled. In support of our argument that the question of cultivation demanded early attention, note may be made of the recent action of the Cradock Agricultural Society, which has offered a prize of £100 for the best lucerne cultivator to be tested under South African working conditions. It has been recognised that in many districts grass and weeds are surely supplanting lucerne, and that their eradication is essential to the very existence of the industry, and further that the conservation of moisture and stirring of the soil will effect a very considerable increase in the crop. The article under discussion, however, represents, to the best of our knowledge, the first definite contribution in South Africa to this subject. Mr. Williams "thinks nearly everyone knows that the right way to plant lucerne is in drills and that cultivation is necessary," but he is asked to state what acreage of drilled and cultivated lucerne could be seen in Weenen prior to the establishment of our experiment plots. Mr. Williams further states that the artificial manures chosen were quite the wrong ones, and suggests Kainit! A reference to the Analyst's report for 1903 shows that the Kainit now sold on the Natal market contains only 12·7 per cent. of potash with a total manurial value of £2 19s. 3d. per ton, for which the price asked is £3. In place of this chloride of potash (muriate) was employed for these experiments, showing 58·58 per cent. potash of a total manurial value of £13 13s. 4d. per ton, for which the price asked is £13 10s. The adoption of Mr. Williams' suggestion would therefore entail the payment on the part of settlers of nearly five times the amount in railway carriage for an equal quantity of available potash. Kainit further contains some 30 per cent. of sodic chloride (common salt), and it has been repeatedly demonstrated that sodium salts are the curse of irrigated lands, examples of which are only too common at Weenen. Kainit is therefore in every respect the least suitable potash fertilizer for irrigated lucerne, being expensive, very heavy, and

possibly injurious. Mr. Williams is somewhat difficult to follow when he writes that kainit and potassium salts should be given a trial, for the former is essentially a potash manure, discarded for the reasons given above, and the only profitable alternative, the muriate, has been represented singly and in combination with superphosphate in these experiments. He further suggests that nitrate of soda and sulphate of ammonia be employed, but it is a first principle of agriculture that nitrogenous manures cannot be economically employed with a leguminous crop such as lucerne, which possesses the power of fixing atmospheric nitrogen. Such being the case it is difficult to know what commercial fertilizers could be added to the list already published. Mr. Williams' suggestion *re* quantities of fertilizers and irrigation water have been anticipated and the experiments are already in hand, and it is hoped that results may be published before the end of the coming season.

Agents for the Moline Rotary Cultivator are Messrs. Malcomess and Co., of Durban and East London, from whom a quotation of cost could be secured. A detailed description of the home-made grader, a sketch of which was thought to be self-explanatory, will be published in the ensuing issue of the *Journal*.—E. R. SAWER, Director E.S.]

BURLINGTON HYBRID MEALIES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I have just threshed and sacked the returns from an experimental patch of Burlington Hybrid mealies, and the result is so very satisfactory that I feel constrained to ask you to publish it as, if this mealie will grow in other parts of the Colony as well as it has done with me, then its cultivation should be encouraged as much as possible.

My seed plot was a measured $8\frac{1}{4}$ acres; but, as a few yards on river side got washed out in our January flood, I only estimate upon a full 8 acres. From this piece of ground I have just power-threshed and sacked up *one hundred and forty muids seven pounds net*.

I planted 15 lbs. seed to the acre, in rows 34 inches apart, using 400 lbs. of Thomas' phosphates (last year this piece of land carried potatoes, and for that crop had a dressing of 6 cwt. Fison's complete potato fertilizer). Land was prepared by disc-ploughing twice; then the rows were opened and the manure applied along the rows. Then a light subsoiler was run down each row, and the seed planted behind it, and finally the land was tooth-harrowed. Crop cultivation consisted of: anti-clog weeder twice; scuffed three times; hand-hoed twice. Planted on November 15th and 16th, they were ready to reap early in March, although, owing to the rush of other work, I let them stand very much longer, and on this account no doubt the weight was reduced somewhat.

This mealie belongs to the sweet corn family, and that justifies

closer planting than can be practised with our other varieties. I secured my seed from Messrs. F. Kirchhoff & Co., of Johannesburg; and, judging from a letter received from them, my case does not appear to be an isolated one. I trust other growers of this variety will also publish their returns.

I may state that the land these were grown on is a deep light red, slightly sandy; and this is the fourth crop it has carried.

I may mention that my neighbour, Mr. Mortimer, of "Wykom," and others have more than once examined these mealies at different stages of growth, and Mr. Mortimer has seen the reaped crop.—Yours, etc.,

F. W. K. PANZERA.

Ekutokozeni, Ingogo.

FRUIT CULTURE.

MRS. H. E. KIRBY, Highlands, writes requesting information on the following points:—

1. What is the difference between "self-sterile" and "self-fertile" as applied to pear trees? She presumes the difference is ascertainable from the blooms. Are the bearing and non-bearing flowers in the pear as distinct as they in the cucumber? She frequently inoculates the latter, especially if bees are not plentiful.

2. In grafting pears on to quince stocks, must the stocks be of the bearing kind?

3. Where are Marianna plum roots to be had; and what is the origin of the Marianna plum?

4. What will the result be if she takes manure from the cattle kraal, pigsty, and fowl roost, and ashes, all mixed up, and apply to the orchard?

5. In budding on the old peach stocks, is it absolutely necessary that the stocks should be transplanted?

6. Some of her 5-year-old apple trees are showing blight (*Aphis*) badly. She has been advised not to prune them, as last year she painted every cut with castor oil, and this season the *Aphis* (in some cases) is in possession of the trees.

To this the Conservator of Forests replies as follows:—

1. Self-sterile pear trees are those in which the flowers of one tree do not fertilize themselves, and pollen from another tree is necessary to effect fertilization. On self-fertile pear trees the flowers fertilize themselves. The flowers are usually so nearly perfect that no difference in appearance is to be noticed, but if a self-sterile kind is grown at a long distance from any other pear trees it is not likely ever to bear a crop. If grown along with others it will only crop if the pollen of some other kind is available at the same time as the pistils are in condition to receive it. Planting different kinds mixed usually effects fertiliza-

tion, and I have never known artificial fertilization to be resorted to in the case of pears grown in the open air.

2. Any quince stock may be used for grafting pears on, but the results will depend very much on the nature and moistness of the soil. All quinces bear if properly treated, but the quince is often not the best stock for the pear.

3. Marianna plum is seldom grown for its fruit, but rather as a stock for other kinds. It is not in use in this way in this country, but is often so used in America.

4. Satisfactory.

5. No, it is not advisable.

6. The apple trees should be pruned if they require it, quite irrespective of the blight.

Animal Diseases in June.

THE POSITION OF EAST COAST FEVER.

THE Principal Veterinary Surgeon (Mr. S. B. Woollatt) reports that the following outbreaks of East Coast Fever occurred during the month of June:—Sunday's River 1, Vryheid and Ngotshe 7, Durban County 1, Dundee and Umsinga 5, Paulpietersburg 2 (on already infected farms). The following deaths from the disease were reported during the month:—Lower Tugela and Mapumulo 159, Ladysmith 34, Vryheid and Ngotshe 750, Durban County 146, Umvoti County 4, Muden 40, Dundee, Umsinga and Nqutu 467, Paulpietersburg 184. No record is being kept of deaths taking place in Zululand. Exclusive of those that took place in Zululand, there were therefore 1,784 deaths recorded during June.

With reference to the outbreaks in the Ladysmith district, Mr. Woollatt states that all the cattle within the infected area were branded, and a zone free of cattle formed around them. The branding of cattle within that portion of the Ladysmith district on the east of the main line is also being proceeded with, but the brand used here will be different from that used within the actually infected area. Another outbreak occurred in the Ladysmith district towards the junction of the Tugela and Sunday's Rivers. Only one native kraal is affected on the Ladysmith side, the remainder of the outbreak being on the Umsinga side of the river. This outbreak was not known by the Veterinary Department to exist until the end of May, and there appears to be no doubt, Mr.

Woollatt remarks, from the number of skins found at the scene of the outbreak that some 70 head of cattle had died previous to the information being received by the Department, notwithstanding the fact that, when East Coast Fever first appeared in the Dundee and Umsinga districts, the natives were warned by the Magistrates to report any deaths which might occur amongst their stock. This outbreak has occurred in a very rough and inaccessible part of the country, where a number of cattle might die without being detected if the owners did not report the fact, even if the Department had a number of officers inspecting the district. It must be conceivable, Mr. Woollatt thinks, to anyone who has a knowledge of this district, that a Stock Inspector having under his supervision the whole of the Klip River district or the whole of the Umsinga district cannot know of all deaths which are taking place in remote corners of such districts. It has been said, since this outbreak has been detected, that cattle had been known to have died there for some time. If an individual was in possession of such information, Mr. Woollatt adds, it is to be regretted that he did not realise that it was his duty to make a report to the Department. All the cattle concerned in this outbreak have been removed from the infected and veld adjacent to infected veld through temperature camps.

In the Muden area on the Weenen side the disease has made considerable progress; and it is on this account that arrangements have been hastened for the taking over of these cattle and disposing of them for slaughter. Since the granting of free railage ceased there has been a falling-off in the number of cattle trucked in the several infected districts.

In Durban County there was one fresh outbreak of East Coast Fever. Though within the actually infected area, it is on the side of this area towards Umkomaas. It is hoped to be able to satisfactorily deal with the cattle in this area and thus remove the great danger that is being incurred at present through animals being removed across the Um-lazi Location.

The fresh outbreaks reported in the Dundee Division are in the vicinity of the farm "Hazeldean." In this vicinity, along the Buffalo Flats, there are no fences, and the disease, D.V.S. Bruce states in his report to the P.V. Surgeon, will continue to spread here, as may well be expected, at a considerable rate. Overlapping in grazing is the cause of this, as most of the owners have shown no anxiety regarding the East Coast Fever until the disease has actually appeared amongst their own stock. Temperature camps have not been adopted here, but all infected and in-contact herds have been branded with the infected area brand.

Dundee is the chief district concerned with regard to the question of the adoption of a stamping-out policy. The number of cattle it is considered necessary to remove if such a policy were adopted is seen from a statement in D.V.S. Bruce's report that, in the Dundee-Umsinga

area, taking a 3-mile radius around all infected areas, the number of cattle is 7,547. These, Mr. Bruce adds, may be considered as infected and in-contact cattle, and are being branded accordingly.

To date, no East Coast Fever is known to exist north of the Glencoe-Vryheid railway. South of this railway many of the owners have disposed of their cattle for slaughter purposes.

In the Mahlabatini and Nongoma districts of Zululand, as in the Vryheid district, the disease, Mr. Woollatt states, is making considerable and certain progress.

OTHER DISEASES.

Lungsickness.—There have been no further outbreaks of this disease, and it is hoped that the infection amongst the troops under license has died out.

Sheep Scab.—During the month there were 40 fresh outbreaks, and six licenses were raised.

Glanders.—In the Newcastle district two animals were destroyed during the month, reacting to the Mallein test. One death took place in the Dundee district.

Biliary Fever.—One death occurred from this disease.

Anthrax.—One death was reported.

Quarter-evil.—Two deaths took place from this disease.

Poverty.—In the Verulam district deaths from poverty were of frequent occurrence during the month, necessitating constant supervision on the part of the District Veterinary Surgeon and the Stock Inspector. Wherever possible a *post-mortem* examination is being made.

Importation of Stock by Sea.—D.V.S. Amos reports that 201 horses, 185 mules, 186 donkeys, 1 bull, 294 sheep, and 17 dogs were imported into Natal by sea during June. Of the horses, 193 came from the Argentine Republic and the remainder from England. The mules and donkeys came from Argentina. All the sheep came from Australia, and were breeding stock proceeding to the Transvaal and Orange River Colony. The bull and the dogs came from England.

For a combination of early laying with table propensities the recently resuscitated Sussex fowl occupies an exceptional position, and we are glad, says the *Agricultural Gazette* (London), that it is receiving so marked a degree of favour, though there are dangers even in that at the present time, owing to an undue attention to merely external characters. It is, however, a breed well worth the attention of practical poultry keepers.

South African Markets.

THE prices for live stock, and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg, and other South African markets during the month of June-July, have averaged as follows:—

NATAL.

PIETERMARITZBURG.—The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Fowls, 2s; ducks (Muscovy), 1s 9d; (English), 2s 3d; turkeys (cocks), 10s; (hens), 5s; rabbits, 1s 6d.

Animal Produce.—Eggs, 1s 4d per doz; butter, 1s 6d per lb; cheese, 8d per lb; bacon, 7d per lb; ham, 9d per lb; pork, 5d per lb; lard, 8d per lb; honey, 6d per lb; hides, 7d per lb.

Vegetable Produce.—Buckwheat, 12s 9d per muid; earth nuts, 10s per muid; barley, £2 10s per ton; oats, £2 per ton; hay, 30s per ton; kaffir corn, 8s per muid; mealies, 7s per muid; potatoes, 9s per muid; sweet potatoes, 3s per muid; peas, 18s per muid; onions, 10s 6d per muid; beans, 15s per muid; pumpkins, 30s per ton; bananas, 1s 6d per hundred; oranges, 2s per hundred; naartjes, 2s per hundred; lemons, 6d per hundred.

DURBAN.—The Market Master reports the following average prices realised on the Durban market during the month ended 15th July:—

Live Stock.—Sucking pigs, 4s; fowls, 2s 1d; ducks, 2s 6d; turkeys, 8s; guinea-fowls, 3s 6d; rabbits, 9d.

Animal Produce.—Eggs, 1s 6d per doz; butter, 1s 6d per lb; bacon, 7d per lb; pork, 3½d per lb; honey, 6d per lb.

Vegetable Produce.—Kaffir corn, 9s per muid; mealies, 7s 6d per muid; potatoes, 10s 6d per muid; sweet potatoes, 3s per muid; turnips, £2 15s per ton; pumpkins, 5s per ton; oranges, 9d per hundred; naartjes, 1s per hundred; avocado pears, 2s per doz.

TRANSVAAL.

JOHANNESBURG.—Writing under date July 15th, Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, representing the Farmers' Co-operative Associations of the Cape Colony, reports the following average prices realised on the Johannesburg market during the preceding week:—

Live Stock.—Cows (milk), £18 to £35; oxen (slaughter), £8 10s to £11 10s; oxen (dressed), £1 12s 6d to £1 15s per 100 lbs; sheep (slaughter hamels), 20s to 25s; sheep (dressed), 5½d to 5¾d per lb; donkeys, £6 to

£9; mules, £15 to £20; fowls, 1s 6d to 3s; geese, 5s; turkeys (cocks), 7s to 13s; (hens), 3s 6d to 7s; ducks, 2s 3d to 3s 6d.

Animal Produce.—Eggs (new laid), 2s to 2s 6d per doz; (fresh), 1s 9d to 2s per doz; butter, 1s to 1s 3d per lb.

Vegetable Produce.—Bran, 7s 6d to 8s 9d per bag of 100 lbs net; barley (grain), 10s 9d per bag of 160 lbs net; beans (dry), 9s to £2 3s per bag of 200 lbs net; chaff, 3s 9d to 4s 6d per 100 lbs; forage, 6s 6d to 7s 6d per 100 lbs; kafir corn, 12s 3d to 12s 9d per bag of 200 lbs net; lucerne (dry), 5s 6d to 6s 6d per 100 lbs; earth nuts, 15s to 18s per 100 lbs; manna, 2s 3d to 3s 9d per 100 lbs; mealies: white 8s 9d to 9s, yellow 9s 3d to 9s 9d, mixed 8s 6d to 9s per bag of 200 lbs net; onions, 9s 6d to 12s per muid; oats (seed), 10s 6d to 11s per bag of 130 lbs net; peas (dry), 15s 6d to 18s 6d per bag of 200 lbs net; potatoes, 13s 6d to 16s, medium 9s to 13s 3d per bag of 160 lbs net; sweet potatoes, 4s to 8s per bag of 120 lbs. net; wheat, 18s to 20s 6d per bag of 200 lbs net; fruit: avocado pears, 3s per doz; bananas, 2s to 3s 6d per 100; lemons, 2s to 4s per 100; naartjes, 1s 6d to 4s per 100; oranges, 2s to 4s per 100; pine-apples, 2s 6d to 3s 6d per doz.

NOTES.

Mr. Webb also furnishes the following notes upon the conditions prevailing in the Johannesburg market:—

Live Stock.—Prices for the month ending 15th inst. are generally better than those shown in my last report. An occasional shortage in supplies caused prime beef to realise as high as 40s per 100 lbs during the month, but the majority of sales have averaged out at from 32s 6d to 35s, with plenty of stock coming forward. The tendency of the slaughter market is to harden as the winter goes on, and advanced prices are anticipated next month. At the time of writing only best-conditioned animals command active business at top prices. A good enquiry exists for fat slaughter hamels and lambs, as also for pigs dressing from 80 to 100 lbs. As previously predicted, values for all classes of poultry have increased appreciably, and a big business can be done in this section.

Animal Produce.—Eggs and butter are placed at current quotations, with a constant demand from the market for best quality. Monthly contracts can be placed for guaranteed goods.

Vegetable Produce.—Prices for most grain foods have eased off automatically with over-supply, and as consignments show no signs of diminishing there is little animation in the market unless an exceptionally fine parcel comes under the hammer. Mealies, barley, beans, peas, oats and bran are all lower, and only first quality is in demand. A fair enquiry continues for best varieties of kafir corn; and good dry yellow onions are firm at current quotations. Forage is easier, due primarily to over-speculation in outside dealings; whilst potatoes of best quality

are enquired for at firmer rates. Large consignments of pressed lucerne are under offer from the Cape at higher values than this market can give. Big business in this article can be done on the basis of 6s per 100 lbs delivered, provided the hay is of first quality and green-coloured.

Fruit.—In this section large transactions have taken place in citrus varieties, and better all-round prices would have been recorded if growers had taken more trouble to make themselves acquainted with the requirements of this market. I shall be very pleased to answer all enquiries in regard to grading, packing, etc. Fruit-growers in Natal are cautioned that all fruit forwarded to Johannesburg infected with scale is fumigated at a cost of 4d to 8d per case, according to size of package, and that any naartjes found infected with codlin moth are immediately destroyed.

PRETORIA.—Messrs. M. Guinsberg & Co., produce and commission merchants, report the following average prices realised on the Pretoria market during the week ended July 19th:—

Live Stock and Animal Produce.—Pigs, £1 18s to £2 11s; fowls, 1s 6d to 3s 4d; eggs: local 2s to 2s 4d, Colonial 1s 5d to 1s 8d per doz; butter, 1s 6d per lb.

Vegetable Produce.—Mealies: yellow 8s 6d to 9s, white 8s 3d to 9s 6d per 203 lbs; bran, 9s 6d to 10s 6d per 100 lbs; forage, 20s to 23s 6d per 100 bundles; forage, inferior, 16s to 19s; hay, pressed, 6d to 1s 4d per bale; potatoes: local 14s to 16s, medium 10s to 13s 6d per bag; tobacco, 4½d to 6d per roll; lucerne, green, 1s to 1s 9d per doz bundles.

CAPE COLONY.

The following information has been compiled from the latest available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 13th July), appearing in the *Cape Times*:—

Grain, Cereals, etc.—During the week under review the demand for wheat was exceedingly strong, which was anticipated to continue until a fall took place in the Australian market. There were large supplies of the Caledon oat on the market, for which buyers were not immediately forthcoming. A demand cannot be recorded for rye or barley, mealies replacing the latter article. Compressed chaff was steady and sales had been effected. Kafir corn was slightly easier. Lucerne and oathay remained very firm. Mealies were plentiful in the O.R.C., Natal, and Eastern Province varieties. Prices were easier, although advices stated that the Bloemfontein market was slightly firmer.

The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 lb.—Caledon, 1st, 16s 9d to 17s; Malmesbury, 17s 9d to 18s; Moorreesburg, 17s 6d to 17s 9d; Porterville-road, 18s to 18s 6d.

Colonial oats, per 150 lbs.—Caledon, 1st, 8s 6d to 8s 9d; 2nd, 8s to

8s 3d; Moorreesburg, 10s to 10s 1½d; Malmesbury, 10s 2d to 10s 3d; Main Line, 10s 7d to 10s 9d.

Colonial barley, per 150 lbs.—Moorreesburg, 9s 9d to 10s; Main Line Stations, 10s to 10s 6d.

Colonial rye, per 200 lbs.—Country stations, 16s 9d to 17s.

Kafir corn, per 200 lbs.—Red, 12s 9d to 13s; white, 12s 6d to 12s 9d, ex stores, Capetown.

Bran, per 100 lbs.—6s to 6s 3d, stores, Capetown.

Mealies, per 200 lbs.—Natal yellows, 12s 3d to 12s 6d; O.R.C. small yellows, 14s to 14s 6d; Natal white coast, 10s 6d to 11s; Eastern Province Germans, 13s to 13s 6d; Eastern Province mixed, 12s 9d to 13s.

Forage, per 100 lbs.—Colonial lucerne hay, 5s 6d to 5s 9d, ex stores, Capetown; Colonial oathay, 4s 8d to 4s 9d, Main Line stations; Moorreesburg, 4s 4d; Malmesbury, 4s 5d to 4s 6d; Colonial fodder, 5s 6d to 5s 9d, ex stores, Capetown; Colonial compressed chaff, 1s 11d to 2s, Main Line stations; Moorreesburg and Malmesbury, 1s 9d to 1s 10d.

Live Stock.—The demand for live stock remains firm. The average prices realised during the week under review were:—Prime slaughter oxen, 37s 6d to 38s 9d per 100 lbs dressed weight; slaughter sheep, 48 to 50 lbs dressed weight, 22s 6d to 24s 6d.

Animal Produce.—Butter (Colonial): best 1s 3½d wholesale, 1s 3d in bulk, retail 1s 6d per lb; cheese: good Colonial Cheddar 10½d per lb wholesale, Colonial Camembert 10s per doz; Colonial National Cream 4s 6d per doz; eggs, 10s 6d to 13s 6d.

Morning Market.—Cape lemons, 10d to 1s; limes, 2s 6d to 3s; bananas, 20s to 22s; oranges, 1s 1d to 4s 1d; naartjes, 7d to 6s 9d; potatoes, 12s to 14s; sweet potatoes, 6s to 7s; onions, 7s; beans, 24s; Natal beans, 40s to 42s.

PORT ELIZABETH.

Market poorly supplied. All classes of grain excepting mealies. Prices little changed. Potatoes: Market slumped. Overstocked in onions. Rush bedding is required. Strong inquiries for Early Rose seed potato. Seed oats: no immediate hopes of early improvement.

The following average prices were realised during the week ended 6th July:—Mealies, 6s to 6s 3d per 100 lbs; kafir corn, 6s 6d to 7s per 100 lbs; potatoes, 4s to 7s 6d per 100 lbs; sweet potatoes, 2s to 2s 6d per 100 lbs; barley, 4s 3d to 4s 6d per 100 lbs.

KIMBERLEY.

Messrs. Jas. Lawrence & Co., Ltd., reporting for the week ended 13th July to the Bloemfontein *Post*, state, with reference to the Kimberley market:—

Mealies, white and yellow, are coming in very freely for the past week, and prices have receded. Kafir corn is still rather scarce, though we expect fair quantity during next week. Forage and oats are slightly casier. Small demand for good sample lucerne. There is still a good

supply of Colonial meals in the market. Good demand for sound dry onions. Potatoes are still very plentiful and prices low. Fair demand for fresh butter and guaranteed fresh eggs. Poultry plentiful; cabbages have advanced; cauliflowers slightly firmer. Oranges and naartjes very low in price. Game in demand. Very little doing in live stock; no demand for pigs.

Live Stock.—Oxen (good) prime, 600 lbs upwards, £9 to £13; cows (good), 450 lbs upwards, £5 10s to £8; calves, 5½d per lb, dead weight; pigs, 100 lbs (clean), 3d per lb, live weight; lambs, 30 lbs, 12s 6d to 14s; hamels, 40 lbs to 45 lbs, 15s to 20s; oxen (trek), £7 to £8; draught horses, £10 to £25; mares, £10 to £25; ducks, 2s 6d to 3s; fowls, 1s 6d to 2s 3d; turkeys, 4s to 10s; hares, 1s to 2s 6d; guinea-fowls, 2s to 4s.

Animal Produce.—Butter: fresh 1s to 1s 4d, second quality 9d to 11d per lb; eggs, 1s 3d to 1s 5d per doz.

Vegetable Produce.—Bran, 7s 3d to 8s per 100 lbs; barley, 7s 6d to 12s 6d per 163 lbs; forage: good 6s to 6s 6d, inferior 3s 6d to 4s 6d per 100 lbs; kafir corn, S.A., 8s 6d to 11s; mealies: yellow Colonial 8s 6d to 10s, white Colonial (hard) 9s 6d to 11s 6d, mixed 7s 6d to 9s 6d per 203 lbs; mealie meal: O.R.C., 10s 6d to 11s, white 10s 6d to 11s 9d per 183 lbs; Cape oats, 11s 6d to 12s 9d per bag of 150 lbs; lucerne hay, 4s 6d to 5s per 100 lbs; onions, 7s to 11s per bag of 120 lbs; potatoes, 4s to 10s per bag of 120 lbs; wheat, 17s to 20s per bag of 203 lbs; naartjes, 1s to 2s 6d per 100; oranges, 2s to 4s 6d per 100; pineapples, 1s 6d to 2s 6d per doz.

The Oversea Maize Market.

THE following information regarding the oversea maize market has been compiled from *Beerbohm's Evening Corn Trade List*:—

During the week ended 7th June, the continued liberal shipments from Roumania and Russia quite counterbalanced the deficit in the Argentina exports, which latter, moreover, are now increasing. The demand fell off during the week and the prices obtainable for cargoes were 3d. to 6d. lower on the week, 23s. 6d. being the best bid for La Platas for June-July shipment, whilst at the corresponding date last year 20s. 3d. was the price. Danubian-Bulgarian, June-July, would also have come at 23s. 6d., but buyers held aloof, partly because of the improvement in the new crop prospects, owing to the beneficial rains in Roumania. America was offering but little maize and exporting only moderate quantities; and it is stated that the export movement during the remainder of this year is not likely to increase, except at high prices. Last year's exports from June 1st to December 31st were only 30 million bushels, against 53 million bushels in the previous year, and 35 million

bushels in 1904. The future course of maize prices has, no doubt, the *Corn Trade List* continues, to be connected to some extent with that of wheat, seeing that other feeding-stuffs remain very dear, and under these circumstances one can hardly foresee low prices for maize, especially as the main depressing element, viz., an almost unlimited supply of La Plata corn such as has existed for the past few years, will be absent this year.

During the week ended 14th June, there was a very poor demand for maize, and prices gave way rather decidedly. Shipments continued quite liberal, especially for the U.K., thanks to a large output from Roumania and Russia. Argentina also was beginning to ship more freely, though the total since May 1st was still very small compared with previous years, viz., 612,000 qrs., against 2,075,000 qrs. last year. According to recent mail advices, there was still much difficulty in arriving at any definite conclusion with regard to the probable surplus this year, the estimates still ranging from $2\frac{1}{2}$ to 5 million quarters, as compared with 12 million quarters last season. The present visible supply in Argentina is about 275,000 quarters, against about 600,000 quarters last year, and 900,000 quarters in 1905. Very few cargoes changed hands during the week under review; 23s. 3d. was accepted for 2,700 tons La Plata, lately sailed, whilst July-August shipments would come at 22s. 9d., thus showing 9d. to 1s. decline on the week; for Danube-Bulgarian, June shipment, 22s. 4½d. is refused. Parcels for London fluctuated considerably, and were decidedly easier compared with the preceding week; 23s. was paid for Gal-Fox, June-July shipment, on 7th June; on 12th as low as 22s was accepted, but on the following day up to 22s. 7½d. was paid. Odessa afloat sold at 22s. 9d. c.i.f., whilst spot parcels ex-ship were offered on the 12th at 22s. 1½d.

There was a decided improvement in the market during the week ended 21st June, in spite of very large Roumanian shipments. The U.K. demand was not, perhaps, very active, but for the Continent there was quite a good enquiry, and 6d. to 1s. advance on cargoes was easy to obtain; 23s. 6d. to 23s. 7½d. was bid for La Plata steamers afloat, whilst for shipment 23s. 4½d. to 23s. 6d. was paid; Bessarabian, June O/S shipment, made 24s. 6d., Foxanian afloat 24s., and Danubian shipping 23s. 3d. Parcels for London were quite active during the week. The recent wet weather in Roumania has been extremely beneficial for the growing maize crop, the area sown being also believed to be much larger than last year, much land usually devoted to barley and oats being sown with maize, because it was too late to sow barley or oats. The Hungarian area under maize is also reported to be 500,000 acres greater than last year and to be promising well. In Mark Lane, during the week in question, up to 24s. ex-ship was paid for picked samples of kiln-dried American, whilst Odessa ex-ship was worth 23s. 6d. to 23s. 9d., or 1s. 6d. above the price accepted ten days previously.

There was not much activity in the maize market during the week ended 28th June, but the good Continental demand served to maintain prices, in spite of very large shipments. The American shipments this season have been, remarks the *Corn Trade List*, very disappointing in quantity, in view of the record crop supposed to have been harvested last year. During the week 23s. 4½d. was accepted for La Plata cargoes afloat, a price which would buy other cargoes loading or for shipment; 23s. was taken for a steamer of Danubian Gal-Fox afloat for U.K., whilst the Continent paid 23s. per 480 lbs. for a handy cargo loading, and 23s. 9d. to 23s. 10½d. for cargoes of Novorossisk for shipment. According to latest cabled advices, the American crop was not in a very favourable condition, either in Kansas or the North-West, owing to the cold weather. With regard to the probable future of maize, it is not easy, remarks the *Corn Trade List*, to foresee any important changes; there is evident abundance in Roumania and Russia, and evident relative scarcity in Argentina, thus reversing last year's conditions. It may be argued that abundance in South-Eastern Europe is not so depressing a factor as similar conditions in Argentina might be; but, perhaps, the strongest feature in favour of maize prices being maintained for some time at a fairly high level is its relative cheapness compared with other feeding stuffs, and compared also with wheat.

The general statistical position of maize carried up to date (June 23th) was as follows:—

			1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	...	...	910,000	985,000	800,000
" " Cont.	...	...	1,290,000	1,100,000	805,000
Imports into U.K. for the 25 weeks ending June 22	...	...	5,334,900	5,247,900	5,168,850
Visible supply in U.S. (<i>Bradstreet's</i>)	...	...	1,863,200	1,287,800	871,300
			1906-7	1905-6	1904-5
American crop	...	...	340,000,000	316,000,000	285,000,000
			1907.	1906.	1905
New York, Spot	...	...	63c	59½c	62½c
Mark Lane, Mxd. Am. ex-ship	...	...	23/9	22/6	23/9

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America ...	2,588,000	2,810,000	3,108,000	4,857,000	3,139,000	4,297,000
Argentina ...	944,000	638,000	2,022,000	1,545,000	1,864,000	1,136,000
Russia ...	849,000	1,135,000	99,000	129,000	149,000	319,000
Danube, etc.	1,064,000	1,662,000	121,000	644,000	118,000	133,000
Total ...	5,445,000	6,245,000	5,350,000	7,175,000	5,270,000	5,885,000

* Includes shipments for orders.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of June, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rain-fall in 1 day.		Total for Year from July 1st, 1906.	Total for sameper'd from July 1st, 1905.	
	Maximum.	Minimum.					Fall.	Day.			
Observatory ..	74.4	52.4	83.5	46.3	.34	6	.27	18th	41.37	37.5	
Stanger ..	75.3	52.9	83	47	1.11	7	.53	1st	39.86	36.64	
Verulam ..	75.6	50.1	85	45	.15	2	.10	17th	42.24	28.90	
Greytown ..	70.2	33.2	2	30	.02	1	.02	18th	37.29	25.02	
Newcastle ..	70.2	34.6	77	27	Nil	—	—	—	55.60	30.27	
Estcourt ..	70.3	32.3	73	25	Nil	—	—	—	30.66	24.82	
Ndwedwe ..	64.3	53.0	73	47	.12	2	.07	18th	40.78	37.26	
Mid-Illovo ..	70.5	48.0	83	40	.14	3	.12	18th	44.42	23.55	
Camperdown ..	7.2	43.0	83	33	Nil	—	—	—	39.84	—	
Port Shepstone..	74.8	50.9	87	46	.98	2	.90	18th	—	—	
Umzinto ..	72.1	47.7	76	43	.37	2	.22	17th	47.45	36.18	
Richmond ..	70.9	49.7	82	33	Nil	—	—	—	51.83	34.04	
Maritzburg ..	72.9	36.7	82	30	Nil	—	—	—	53.05	26.01	
Howick ..	68.5	32.7	80	23	Nil	—	—	—	43.83	24.32	
Dundee ..	64.0	40.8	72	20	Nil	—	—	—	37.61	23.4	
Weenen Gaol ..	74.7	30.6	84	24	Nil	—	—	—	30.85	22.45	
Impendhle ..	62.8	34.1	68	25	.01	2	.01	16th	46.72	—	
New Hanover ..	70.7	35.4	82	23	Nil	—	—	—	55.80	27.36	
Nqutu ..	66.2	42.6	74	36	Nil	—	—	—	—	20.47	
Nongoma ..	71.3	43.0	79	37	.25	1	.25	20th	43.32	21.97	
N'Kandhlhla ..	65.5	35.8	72	19	.25	2	.23	18th	34.90	25.01	
Mtunzini ..	70.5	38.0	73	32	.67	3	.37	17th	—	—	
Hiabisa ..	75.0	54.3	84	50	Nil	—	—	—	44.93	27.20	
Melmoth ..	69.7	47.7	79	40	.12	1	.12	19th	33.81	23.21	
Ubombo ..	77.4	52.8	85	41	.10	2	.07	14th	49.51	—	
Point ..	—	—	—	—	.55	4	.47	18th	43.22	42.23	
Bulwer ..	—	—	—	—	.00	1	.00	1st	—	—	
Charlestown ..	62.1	20.5	67	20	Nil	—	—	—	53.46	—	
Vryheid ..	60.3	38.5	73	31	Nil	—	—	—	36.55	—	
Mahlabatini ..	75.6	45.1	86	40	.03	1	.03	8th	35.93	23.8	
Amatikulu ..	75.3	47.5	84	42	.47	5	.32	17th	23.13	—	

Meteorological Observations taken at Private Stations for Month of June, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain- fall in one day.		Total for Year from July 1st, 1906.	Total for same period from July 1st, 1905.	
					Fall.	Day.			
Giant's Castle	64.1	35.9	Nil	—	—	—	49.58	28.76	
Adamshurst (Win. Adams)	86	36	—	—	—	—	—	—	
Ottawa (G. Wilkinson)	—	—	0.20	1	0.20	19th	43.56	—	
Mount Edgecombe (Natal Estates)	90	47	0.20	3	0.17	19th	49.16	34.12	
Corubia	—	—	0.35	—	—	—	51.13	30.69	
Milkwood Kraal	—	—	0.12	—	—	—	37.88	22.68	
Blackburn	—	—	0.32	—	—	—	42.54	27.6	
Saccharine	—	—	0.16	—	—	—	43.55	28.44	
Equeefa (W. Hawkesworth)	56	49	0.43	3	0.26	18th	51.57	34.76	
Umzinto, Beneva	—	—	0.34	3	0.21	17th	43.91	33.87	
Winkel Spruit	83	46	0.22	3	0.14	17th	45.11	39.17	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of June, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons. Cwt
Natal Navigation ..	29	65	233	18	242	140	—	—	—	18,907 14
Elandslaagte ..	14	20	270	17	185	417	4	8	7	14,088 15
Dundee Coal Co. ..	15	13	182	8	26	312	1	—	22	11,112 6
Glencoe, Natal ..	13	106	82	11	494	14	—	—	—	10,106 14
St. George's ..	16	120	118	11	188	103	—	8	—	9,854 —
South African ..	10	11	80	11	220	45	5	28	46	9,343 10
Natal Cambrian ..	10	34	136	10	258	63	2	2	—	9,004 1
Durban Navigation ..	29	115	44	11	238	43	1	4	—	8,977 —
Newcastle ..	8	42	21	6	250	2	1	2	—	6,240 7
Natal Steam Coal Co. ..	1	41	3	2	149	2	1	2	2	2,745 2
Ramsay ..	2	12	35	5	130	100	3	6	11	2,346 7
West Lennoxton ..	5	1	62	2	7	95	—	—	—	2,541 —
Central ..	3	51	10	5	97	8	—	2	—	2,521 10
Talana (Natal) ..	2	10	14	2	27	32	1	3	3	865 16
Zululana ..	2	40	—	1	55	—	4	10	—	504 10
Woodlands ..	2	5	4	1	8	4	—	—	—	219 —
Vryheid ..	3	7	—	3	9	—	—	—	—	40 —
Signal Hill ..	—	—	—	—	—	—	1	1	—	10 —
Dumbi Mountain† ..	1	2	—	—	—	—	—	—	—	8 —
Nooitgedacht ..	—	2	—	1	2	—	—	—	—	4 —
Totals ..	166	697	1,303	125	2,705	1,415	24	76	91	110,339 12
Corresponding month, '00	139	619	1,168	127	2,270	1,465	54	241	264	95,138 19

* Cost charged to Capital Account.

† March, April and May Returns.

‡ May Return.

Maritzburg,
6th July, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of June, 1907 :—

					Tons.	Cwt.
Bunker Coal* ..	..	..	..	..	44,102	19
Exported to :—						
Algoa Bay ..	..	..	..	..	6,973	7
Cape Town ..	..	..	..	..	12,166	0
United Kingdom ..	..	..	..	..	2	0
Mauritius ..	..	..	..	..	2,149	15
Total ..	..	..	..	..	65,349	1

* Including Foreign Warships.

Custom House, Port Natal,
1st July, 1907.

(Signed) GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	Mzambi ..	Rossboom
			J. N. De Waal ..	Blauw Bank
			Vellum ..	"
			Mholosi ..	"
			Ingenga ..	Roodepoort
			P. Nicholson ..	Nicholson's Nek
			H. Bowes ..	Zaarfontein
			Mabela ..	Roodepoort
			J. Pepworth ..	Benvogel Vlei
			D. Sparks ..	Berg View
			W. Wright ..	Maggiesdale
			G. J. McDou'ing ..	Waterford
			W. Anderson ..	Netherby
			Jimze ..	Rossboom
			Kantool Zuma ..	"
			E. Moreland ..	Reint Kuil
			Mapelwana ..	Roodepoort
J. R. Cooper	Nkandhla & Ngutu	"	M. Butelezi ..	Jojosini
			Amangayehlezyo ..	Mangene
			Halangana ..	Ngutu
			L. Nene ..	"
			L. Rheuga ..	Dalala
			T. Nxumalo ..	Macebo
			Mkungeni ..	Jojosini
S. A. Brown	Underberg	"	A. Mbala ..	Blood River
			J. A. Stone ..	"
			T. de C. Arbuckle ..	Kerridge
			B. Phipson ..	Strathcampbell
			M. Fraser ..	Winterhoek
			R. C. Gold ..	Woo end
			J. R. Royston ..	Greenend
			J. van Whye ..	Silburn
			F. A. Hathorn ..	Sauwana
			T. Palframan ..	Slogoma
			H. J. Hatting ..	Servitude
			J. J. B. Cooke ..	Estcourt
A. B. Koe	Portion of Estcourt	"	Sclander Bros. ..	Kelvia
			Mnati ..	Labuschagne's Kraal
			H. L. Frances ..	Rietfontein
			Bacon & Kelly ..	Winterton
			F. R. Moor ..	Greystones
			R. J. du Bois ..	Giba
			J. W. de Bruyn ..	Rooifontein
			C. M. Vermaak ..	Paddock
			L. W. Meyer ..	Langverwacht
			A. L. Jansen ..	Strathearn
			J. O. Nel ..	Earncliffe
			A. C. Vermaak ..	Siguna
A. J. Marshall	Dundee	"	T. C. Vermaak ..	Harriotdale
			H. Vermaak ..	Paddock
			J. Dyson ..	The Chase
			P. J. & H. J. Jordaan ..	Prestwek
			P. Mshabi ..	West Port
			Gaga and others ..	Carolina
			Wade Bros. ..	Stanton
			W. J. Slatter ..	Helm Lacy
			W. A. Dales ..	Gowrie
			N. McKellar ..	Glenafon
			R. Spiers ..	Moyeni
			P. R. Nel ..	Broeder's Hoek
E. Varty J. J. Hodson	Western Umvoti .. Ptn of Lion's River	"	Maqamganse ..	Loots Hoek
			Uqupu ..	Myoniezwe's Locat'n
			Ndabane ..	"
			S. Johnson & Co. ..	Inadie Store
			Ndabane ..	Myoniezwe's Locat'n
			Natives ..	Spitzkop
			"	Myoniezwe's Locat'n
			H. L. van Rooyen ..	Krantzkop
			"	"
			"	"
			"	"
			"	"
R. Mayne	Krantzkop	Lungsickness	"	"
			"	"
			"	"
			"	"
		Scab	"	"
			"	"
			"	"
			"	"

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—continued.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. H. Ball	Weenen	Scab	G. J. van der westhuijzen	Winterhoek
		"	C. H. Rottcher ..	Golden Valley
		"	J. P. Lotter ..	Bergvlei
		"	C. F. Lotter ..	Blinkwater
		"	E. E. Robinson ..	Mona
		"	L. C. Kinsman ..	Mount Moriah
		"	Deya ..	Lilyfontein
G. Daniell	Vryheid	"	Vunyo and others..	Elena Berg
		"	D. Coetzee ..	Schaapkopje
		"	R. L. Davies ..	Kambuldraai
		"	Nkanyeze..	Mooiplaats
		"	Mhomon ..	Aanhonvin
		"	Hlabalan ..	Nootgedacht
		"	J. C. Emmett ..	Goudhoek
		"	P. H. Tredoux ..	Bellvue
		"	Myamana ..	Wetvrede
		"	D. Coetz e ..	Doornhoek
R. Mayne	Eastern Umvoti ..	Lungsickness	Mabekashen ..	No itverwacht
		"	C. van Rooyen ..	Boschfontein
		Scab	Nkabi and others	Loots Hoek
		"	P. R. Botha ..	Olivfontein
		"	Nkomo ..	Thorn View
		"	Mtshungongubu ..	Olivfontein
		"	J. Oliver ..	Greytown Town Lds.
J. Button	Portion of Estcourt	Lungsickness	G. J. Mari z ..	Fair View
		Scab	J. Bird ..	Mooi River Tn Lds.
		"	W. Smith ..	Riverside
		"	C. L. Jonnson ..	Darlington
E. Parkin on ..	New Hanover ..	"	Jim ..	Rensburg Spruit
A. Hair	City and Umgeni ..	"	Ndabeni and Jim ..	Location
		"	Umbabana ..	Zwaartkop Location
		"	Ungola ..	Edendale
		"	Unsiwa ..	Zwaartkop Location
		"	Umvell ..	
D. M. Pfaff	Utrecht	"	Voorman ..	Koppie Allen
		"	Hermanus ..	Vecht Kop
		"	Thomas ..	Groot Vlei
		"	Vauns and Lamoen	
J. Stewart	Bergville	"	P. O. Pretorius ..	Geluk
		"	Puzi ..	Klein Waterfall
		"	Menu ..	"
		"	Mseli ..	"
		"	P. H. van der Reit	The Lake
		"	A. Wright ..	Rhenosterfontein
		"	C. Halferty ..	The Falls
R. Wingfield Stratford	Newcastle	"	M. Radford ..	De Wet Stroom
A. Brown	Polela	"	W. Wilkinson ..	Long Elmsell

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Nseleni	Underberg.
Mboyea	Bergville.		

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned stock on the dates specified:—

On the 7th August:—

Boston.—Black ox, no marks or brands, about 3 years old; running on the farm "Crowle," Deepdale, and reported by Mr. D. F. Smith as too wild to be driven to the Pound.

Charlestown.—Black mare, aged, height about 14'1, branded M on right rump.

Finchley (Ixopo Division).—Light bay gelding, blaze, hog mane and tail, large lump on near side under saddle, mangy.

Good Hope (Klip River Division).—Ewe lamb, impounded by Natal Police, branded M on right side, half moon and slit in right ear, about eight months old.

Howick.—(1) Bay pony mare, long mane and switch tail, back points, no brands. (2) Two-year-old heifer, black, with white flank, branded N.2, off-side ear stumped, and near-side ear one notch and bit out of top (running on the farm "Outhorne," and previously reported by Mr. T. W. Woolhouse, but cannot be sent to Howick Pound on account of East Coast Fever restrictions).

Solferino (Gourton).—(1) Little white boar pig. (2) Little white sow pig.

Utrecht.—Black yearling ox branded A.N. left hip. Probable value about £1. Running on the farm "Nooiensboom," Utrecht District, belonging to Mr. J. du Plessis, and reported by I. du Plessis on the 14th June as unable to be driven to the Pound on account of being blind.

On the 21st August:—

Finchley (Ixopo Division).—(1) Black sow pig. (2) Black sow pig, four white feet, white on belly. (3) Small black-and-white sow pig. (4) Black-and-white hog pig.

Hope Farm (Newcastle Division).—Black she-goat, right ear slit, with bluish kid, about six months, no ear-marks.

Loteni.—Bay filly, about three years old, no marks or brands visible (reported on the 17th June as too wild to be driven to the Pound, and running on the farm "Ripon," Underberg Division, occupied by Mr. T. Barnett.

Melmoth.—Ten donkeys (five mares and five foals), light grey colour, no brands or marks.

Mooi River.—Black cow, age 1, white belly, small horns lying forward, branded on near rump, looks like 21 or ZI, very poor.

Nqutu.—Four Kafir goats, mixed colours, one with V cut out off side ear, others with no particular marks.

Umsinga.—(1) Three head Kafir goats, two black and one brown, no brands or marks. Probable value, £1. (2) Two head Kafir sheep, black, no brands or marks. Probable value, 15s.

It is notified that the Pound established at Jackal Spruit, Klip River Division, has been abolished, Mr. F. Bardon having resigned his appointment as Keeper thereof.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	1s., with a minimum of £3 per killing space per month.
Sheep	1½d. each.
Pigs... ..	3d. "
Chilling and Freezing Beef, 1st week	1s. 3d. per qr.
" " 2nd "	1s. "
" " Remaining weeks	9d. "
Sheep " " " " per week	3d. "
Pigs " " " " " " " " " " " " " "	6d. "

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	4s. each (including abattoir fee).
Sheep	6d. "
Pigs	1s. " up to 200 lbs.
"	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

With reference to the visits of Agricultural Associations, in view of the fact that the cost of railway tickets is in future to be borne by the Department of Agriculture, and that the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

27th April, 1907.

W. A. DEANE,
Minister of Agriculture

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Bethman, H. W. F. Bethman, O. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Aitchison. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jan-er, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. Whysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboise, W. R. Quested, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Böhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schäfermann. Hon. Sec. and Treasurer: Frank J. Voek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T. Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President: J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quested, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Finstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos. Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harriss, A. E. Keith, B. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.B.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Sec'y and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: President and James Foster, Committee: F. Remfry, R. Vause,

C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis. Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester, J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LIONS RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut. Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D. C. Aiken, J.P. Vice-Presidents: H. Albers and C. H. Mitchell, J.P. Hon. Secretary and Treasurer: W. J. Plows. Committee: C. Manning, J. W. Aiken, W. G. Camp, T. F. Godwin, J. Hutton, H. Norden and A. Borchard. Hon. Secretary, Show Committee: J. W. Aiken. Show Committee: A. E. Collison, A. Borchard, F. Knoop, A. Ringo, H. F. Voigts, J. Hutton, C. Manning, A. J. Lugg and H. Albers. Hon. Auditor: J. W. Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford, J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Cauterley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer: C. A. Selling. Committee: Otto Rottecher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottecher, C. H. Tilbrook, Rev. H. Rottecher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone, J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, O. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers, W. Gevers, J. H. Holley, jr., W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Merens, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfothenauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O., Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

PIETERMARITZBURGSCHE BOEREN VEREENIGING.—President: D. P. Boshoff; Secretary: E. G. Jansen, 313, Loop Street, Maritzburg.

RICMOND AGRICULTURAL SOCIETY—President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Ohas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom Mc'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Hosking.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Vice-Presidents; Committee: G. J. Macfarlane, W. S. Crart, W. H. Cobley, H. J. Stirton, W. J. O'Brien. L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

UTRECHT BOEREN VEREENIGING.—President: D. J. A. van der Spuy; Secretary: G. J. Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger)

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay; and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Catherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Catherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortlepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 94.—Cottchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 99.—Englishman, 17, Colonial born, anxious to learn farming. No previous experience.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

No. 101.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugarcane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

- No. 1.—“Notes on Fruit Culture,” by Claude Fuller. [1902]. (*Out of print*).
- 2.—“Manures on the Natal Market, 1902,” by A. Pardy. [1902].
- 3.—“Insects in an Important Role,” by Claude Fuller. [1904]. (*Out of Print*).
- 4.—“Manures on the Natal Market, 1903,” by A. Pardy. [1903].
- 5.—“Weed Circular,” by Claude Fuller. [1905].
- 6.—“Manures on the Natal Market, 1904,” by A. Pardy. [1904].
- 7.—“Tree-planting in Natal,” by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—“Agricultural Co-operation,” by E. T. Mullens. [1905]. (*Out of Print*)
- 9.—“Potato Culture” by A. N. Pearson. [1905].
- 10.—“Manures on Natal Market, 1905,” by A. Pardy. [1905].
- 11.—“Agricultural Statistics, Natal, 1904-5,” [1906].
- 12.—“East Coast Fever,” by S. B. Woollatt. [1906].
- 12.—“Manures on Natal Market, 1906,” by A. Pardy. [1906].

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.. TRANSVAAL ...	F. T. NICHOLSON, P.O. Box 134, Pretoria.
.. ORANGE RIVER COLONY ...	E. J. MACMILLAN, Government Buildings, Bloemfontein.

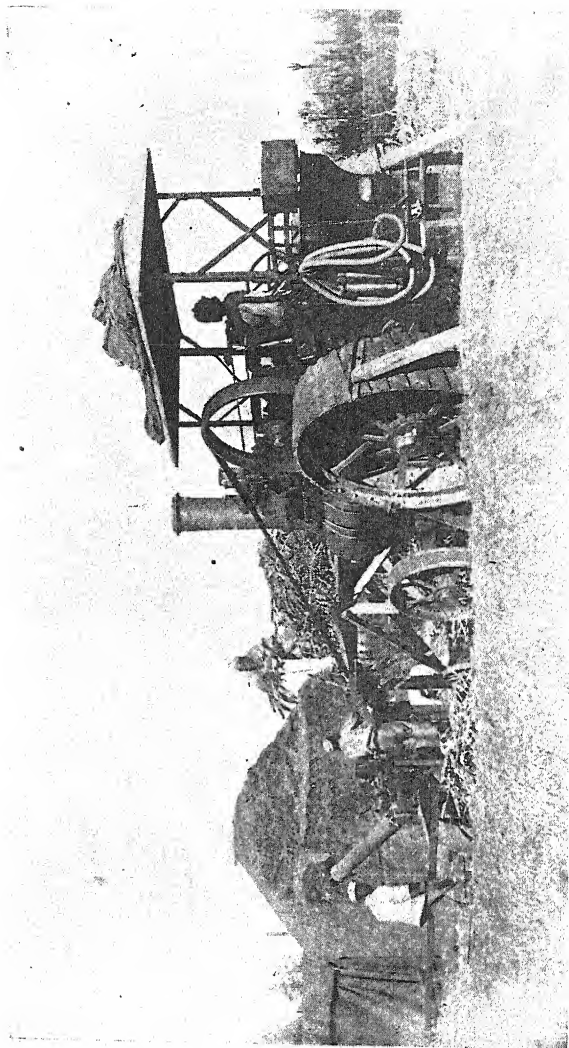
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HUSKER AND SHREDDER IN OPERATION.
Central Experiment Farm, Cedar.

Natal Agricultural Journal and Mining Record.

Winter Feeding of Dairy Cows.

By E. R. SAWER, Director, Experiment Stations.

CHARACTER OF THE ENQUIRY.—Commercial fertilizers are sold on their content of nitrogen, phosphoric acid and potash, and a similar valuation may be made of the common stock foods in accordance with the contained proportions of protein or muscle-forming material, sugars and starches, fats and oils. As in the former case, however, the actual value of such fertilizers in relation to individual crops can only be deduced upon harvest returns, so in the conduct of feeding operations the ultimate criterion is the return obtained in the form of meat, milk, wool, or labour. Tables of chemical composition and feeding standards can only be advanced in acceptable form to the practical stock-owner when supported by concrete results, and it is to the collection of the latter that a series of feeding trials have been directed at our different experiment stations. The subject is often raised at farmers' meetings and in the agricultural press as to the relative values of different feeds, and an effort is being made to supply a convincing answer in the following reports.

FEEDING DIFFERENT CONCENTRATES WITH A UNIFORM ROUGHAGE RATION.

Twelve dairy cows were set aside for this experiment at Cedara and fed for 14 days on a uniform roughage ration without concentrates, and a daily record entered of milk and butter-fat secured. At the end of this time six concentrate rations were introduced and fed for a preliminary period of 7 days to allow the cows to come under the influence of the food. During a further period of 14 days results as tabulated below were secured:—

Roughage Ration.	Concentrate Ration.	Number of Cows.	Yield of Milk during preceding 14 days.	Yield of Milk during preliminary period of 7 days.	Yield of Milk during trial period of 14 days.	Average Butter-fat before trial.	Average Butter-fat at close of trial.	Gain of Milk in 14 days due to concentrates.
10 lb. Chaffed Hay and 20 lb. Sliced Roots	6 lb. Mealie Meal	2	215	112½	273½	4.1	3.9	58½ lbs.
Ditto	4 lb. Mealie Meal 2 lb. Wheat Bran	2	379	202½	465½	3.5	3.6	86½
Ditto	6 lb. Munga or Bul-rush Millet Meal	2	224	133½	313	4.5	4.9	89
Ditto	4 lb. Mealie Meal 2 lb. Brewers' Grains	2	196½	105	287½	4.3	4.4	91
Ditto	4 lb. Mealie Meal 2 lb. Cokernut Cake	2	331½	195	459½	4.9	4.7	128½
Ditto	4 lb. Mealie Meal 2 lb. Ground Nut Cake	2	248½	149	368½	4.6	4.7	120½

It will be noted that bulrush millet (*munga*) meal gave considerably better results than mealie meal when fed in equal quantities, and that the substitution of 2 lbs. of wheat bran or brewers' grains for 2 lbs. of the meal had a beneficial effect. Brewers' grains have a slightly higher value for milk-production than wheat-bran, but considerably less than an equal quantity of the two oil-cakes. The latter, received from the Durban Oil and Soap Works Co., are very worthy of the stock-owner's attention, for the small quantities fed had a most marked influence on the milk-flow, the substitution of 2 lbs. of either cake for an equal quantity of mealie meal resulting in a further average daily yield per cow of $2\frac{1}{2}$ lbs. and 2 1-5th lbs. of milk respectively. In the light of these results, the following examination of these local products by the Analyst of the Transvaal Department of Agriculture will be of interest:

COCOA-NUT CAKE.

"A sample of this material, obtained from Durban, was analysed, and gave the following figures—for comparison I give the average composition of cocoa-nut cake and of 'old process' linseed cake from American analyses:—

	Cocoa-nut Cake.		Linseed Cake.
	A, Durban.	B, Av. American.	Av. American.
Moisture	14.97	10.3	9.2
Ash	8.82	5.9	5.7
Protein	22.63	19.7	32.9
Oil	8.05	11.0	7.9
Carbohydrates }	45.53	38.7	35.4
Crude fibre . . }		14.4	8.9
	100.00	100.0	100.0

"The figures show the Durban sample to be higher in moisture, protein, and ash than the average of the American samples, though poorer in oil.

"It was proposed by my correspondent to use the cocoa-nut cake as part of the rations for horses instead of linseed cake, of which he informs me he could not get the animals to eat more than about 1 lb. per day each. The cocoa-nut cake, though much poorer in protein than the linseed, will probably prove more palatable and better suited for horses. Investigation with French army horses about 1883, indeed, proved that cocoa-nut cake was superior in feeding value to an equal weight of oats and their substitution for oats, at prices ruling at the time, would lead to a saving of about £2 per year in the cost of keeping an army horse.

GROUND-NUT CAKE.

"A sample of this material, also from Durban, has been examined

and yielded the following results—the average of American analyses of the product is also given for comparison:—

Moisture	10.95	10.7
Ash	5.16	4.9
Protein	45.00	47.6
Oil	7.64	8.0
Carbohydrates }		23.7
Fibre }	31.25	5.1
	<hr/>	<hr/>
	100.00	100.0

“The Durban sample agrees very well in comparison with the average American one, but is not quite so rich in protein.

“In using a food so rich in protein as ground-nut cake, it is necessary to feed it in small quantities, or digestive troubles may ensue.

“The albuminoid ratio of the two cakes would be (assuming that all the constituents have the same digestion coefficient, which is not necessarily the case):

	22.65	22.65	1	
Cocoa-nut cake	<hr/>	<hr/>	<hr/>	= 1 : 2.82
	45.53 + (8.05 × 2.3)	64.04	2.82	
	45.00	45.0	1	
Ground-nut cake	<hr/>	<hr/>	<hr/>	= 1 : 1.08
	31.25 + (7.64 × 2.3)	48.82	1.085	

“Both these foods, therefore, require to be mixed with considerable quantities of starchy foods in order to form a ration with an albuminoid ratio of about 1 : 5, which is probably best for hard-worked horses.

“The money value of the two foods, adopting the rough method of calculation described on pp. 818 and 819, Vol. IV., No. 16, of this *Journal** would be:—

“For cocoa-nut cake:

Carbohydrates and fibre, 45.5 @ 2s.	91.0
Protein, 23.63 @ 5s.	113.15
Fat, 8.05 @ 5s.	40.25
	<hr/>
	244.40

i.e., £12 4s. 5d. per short ton.

“For ground-nut cake:

Carbohydrates and fibre, 31.25 @ 2s.	62.5
Protein 45.00 @ 5s.	225.0
Fat, 7.64 @ 5s.	38.2
	<hr/>
	325.7

equals £16 5s. 8d. per ton.

* Transvaal Agricultural Journal,

"These figures are undoubtedly too high, because, in the above calculation, we have assumed all the constituents to be digestible, which is not the case, particularly with the 'fibre.'"

While agreeing that a "home-grown" ration for all stock is very desirable, one may urge that this enterprise is very worthy of support, and warrants an extended cultivation of ground-nuts.

(To be continued.)

Notes and Comments.

AN ERROR.—By a printer's error the descriptions of two of the illustrations appearing in last month's *Journal* became transposed. The illustrations in question are those facing pages 764 and 772, respectively. The wording below the former illustration should have been placed below the second illustration—that facing page 772—and *vice versa*.

"TOBACCO CULTIVATION IN SOUTH AFRICA."—Through pressure of work Mr. Sawyer, Director of Experiment Stations, has been unable to send in his instalment of his series of articles on "Tobacco Cultivation in South Africa" in time for inclusion in the present issue of the *Journal*. A Dutch translation of the last month's instalment will be found elsewhere in this issue.

VISITS TO READING POULTRY FARM.—The Agent-General, in a recent letter, states that, if at any time Natalians visiting England would like to inspect the Poultry Farm and Experiment Station in connection with the University College, Reading, Mr. E. Brown, Secretary of the National Poultry Organisation Society, will be pleased to arrange for them to do so. Mr. Brown's address is 12, Hanover Square, London, W.

TRANSVAAL MEALIE PROSPECTS.—Reporting to the South African Commerce and Manufacturers' Record, on the prospects of mealies in the Transvaal, the Keeling Agency, Ltd., Johannesburg, state that, from a very large number of reports to hand it would appear that the crop in the whole of the Eastern portion of the Transvaal is larger than that of last year. Reports from the Northern Transvaal show, on the whole, that the crops are at least equal, if not better, than those of last year. The Western Transvaal, however, suffered very considerably from locusts, and practically all reports to hand advise that the mealie yield is insufficient for the requirements; this has also been the case, it is stated, on the whole of the Witwatersrand.

NATAL PRODUCE IN JOHANNESBURG.—Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, informs the Department that he is in a position to place large quantities of honey, beeswax, tallow, almonds, walnuts, and fruit of all kinds. Farmers in Natal having quantities of these commodities to dispose of, would do well to place themselves in communication with Mr. Webb.

MOVEMENT OF CATTLE IN DURBAN COUNTY.—The Minister of Agriculture has authorised the movement of cattle within the following area, upon permission in writing being first obtained from the local Permit Officer. The boundaries of this area are:—North, Krantzklouf from Wyebank Station to River Umgeni; south, Scheferman's and Westermeyer's fence from River Umgeni to Main Road to Durban; east, River Umgeni from Krantzklouf to Scheferman's boundary fence; west, N.G. Railways from Wyebank Station to Palmiet Stream, thence along Palmiet Stream to Westermeyer's fence thence along fence to Main Road to Durban.

MR. ALBERT KELLY.—Mr. Albert E. Kelly, who has, for some time, served as a technical and clerical assistant to Mr. Claude Fuller, the Government Entomologist, has recently received an appointment as Assistant Entomologist in the Orange River Colony. At the beginning of August he severed his connection with the Natal Department of Agriculture to take up his duties in his new sphere of activity. Upon the occasion of his departure, his fellow-officers took the opportunity to make a presentation as a token of their friendship and good wishes. His many friends will wish him every success in his new sphere of work. Mr. Kelly was last June elected a Fellow of the Entomological Society of London; and we take this opportunity of congratulating him on the honour which has been conferred upon him.

MADEIRA FRUIT TRADE.—Discussing the fruit trade in his Report on the trade and commerce of Madeira in 1906, H.M. Consul (Capt. James Boyle) says that a most flourishing fruit trade, which was once carried on between Madeira and Great Britain, has collapsed and disappeared, owing entirely to the high capital value of all land in that island and the very costly form of cultivation carried on there, and those interested can no longer compete with the same class of fruit exported from the West Indies and Costa Rica, and also, to a more limited extent, from the Canary Islands. The bulk of the bananas grown in Madeira are sent direct to Portugal. A very small quantity of French beans is sent weekly to London. The cultivation of fruit in Madeira is now, it is stated, almost extinct, owing partly to a variety of insect pests and to the universal planting of sugar cane, which gives a much more remunerative crop.

MEALIE EXPORT FROM TRANSVAAL.—The Johannesburg correspondent of the *Natal Witness* reports that there is a movement on foot to export from the Transvaal some 100,000 bags of mealies during the present season. "After much pressure" the Natal, Portuguese, and Central South African railway systems have, he states, come to an arrangement whereby the coastward rate on mealies for export will be considerably reduced. The rate per ton from Pretoria and Volksrust is fixed in both cases at 13s. 4d. Coupled with the reduction of railway rates, there is also a reduction in sea freight to 15s. per ton, so that it is now apparently possible to forward a bag of mealies from Pretoria via Delagoa Bay to London for something like 2s. 6d.

A S.A. CONDENSED MILK FACTORY.—The news of the establishment of a condensed milk factory in the vicinity of Port Elizabeth will be received with pleasure by all South Africans. It is a sign of better things that such an attempt to establish a local industry of that nature should be made; and it is to be hoped that, in spite of the many difficulties which will have to be overcome, the new venture will succeed in firmly establishing itself and increase its production. If a condensed milk industry can be established in South Africa on a really firm basis, much will have been done in the direction of stopping the flow of money out of the country. Last year the imports of condensed milk amounted to 27,341,774 lbs., of a value of £471,100. Of this quantity £63,488 worth was entered for consumption in Natal. Quotations for the new South African brand have been given at the rate of 5s. per dozen tins on rail at Port Elizabeth. Those interested should communicate with the Commercial Agent of the Agricultural Department, Capetown.

AGRICULTURAL CREDIT IN IRELAND.—There are now about 240 co-operative agricultural credit societies in existence in Ireland. During the year 1905-6 there was a decided increase in their reserve funds, which, in the case of several of the older societies, now amount to £100. During that year, the Irish Department of Agriculture and Technical Instruction continued to advance loans of sums not exceeding £100 to newly-organised banks, charging interest thereon at the rate of three per cent. per annum. About £60,000 was issued for the purpose of enabling the borrowers to purchase live stock, seeds and manures, or to hold over their stock until sales could be effected at a greater profit. In the last Annual Report of the Irish Department of Agriculture, it is stated that these credit societies are generally treated favourably by the joint stock banks, from which a considerable share of their local capital is derived; thus they provide a satisfactory medium by means of which the very poor can utilise the capital of the large banks at a moderate cost.

ENQUIRY *re* NATAL PRODUCE.—The Department of Agriculture has received an enquiry from an East London firm who are much interested in South African industries and South African produce, and who desire to get into communication with manufacturers and producers, in Natal, of such lines as may be suitable for inter-Colonial trade. Readers of the *Journal* who are ready to do business in local products with Cape Colony should communicate with the Department, when the name and address of the firm in question will be furnished to them.

E.C.F. INFECTED AREA.—By order of the Minister of Agriculture, a zone of country has been defined around the E.C.F. infected farms "Acol," "Kleinfontein" and "Brakfontein," Klip River County, with the following boundaries:—On the north, by the boundary between the farms Ruigtefontein and Kleinfontein to its junction with the main line of railway, thence in a southerly direction along the eastern side of the main line of railway to the railway bridge across the Sunday's River, thence in a south-easterly direction along the Sunday's River to the Helpmakaar Road Drift, thence in an easterly direction along the Helpmakaar Road to the point where the road intersects the western boundary of the farm Uitvlucht, thence in a northerly direction along the western boundaries of the farms Uitvlucht and Klipfontein to its junction with the farm Kleine Waterval, thence to its junction with the boundary of the land known as "The Strip," and the farm Ruigtefontein. The removal of all cattle from this zone has been ordered, and no cattle will be allowed to enter or be in that area.

A DESTRUCTIVE WEED.—The Assistant for Seed and Plant Experiments of the Transvaal writes a warning paragraph in the *Transvaal Agricultural Journal* regarding an injurious weed, known botanically as *Tagetes minuta*, L. This weed belongs to the Marigold family, and, like other members of that family, is remarkable for its strong, pungent smell. It is described as "a tall-growing, feathery plant, usually from three to four feet high, and bearing a mass of small yellow flowers in terminal panicles." It is stated that this weed has made its appearance in the neighbourhood of Volksrust and Charlestown, and shows every sign of becoming a cause of serious trouble. Shedding seed in enormous quantities, it is likely to come up thickly in the spring and cause much damage by smothering out the young corn crops. "We are further informed that it does not burn readily, and, therefore, the only method of eradicating it appears to be by ploughing it in or by continual hoeing while the plants are young. Owing to the fact that it has established itself at Charlestown, just across the border, the difficulty of dealing with the plant is increased, but steps are being taken with a view to arranging a joint scheme whereby the spread of *Tagetes minuta* may be checked."

INDIA RUBBER PRODUCTION IN BRAZIL.—In an account of the discovery, sources, supplies and uses of india rubber, in the *American Review of Reviews*, Mr. W. B. Ivins says that the labour problem in the production of india rubber is a crucial one, both in the great Amazon region of South America and the Congo Free State. "The mortality in the State of Amazonas, in Brazil, for example," he says, "corresponds with almost diabolical exactness to the number of tons of rubber produced, so that it is said that every ton of Brazilian rubber costs a human life, and although there are no such atrocities in Brazil as have been charged against the Congo, it is nevertheless true that the labourers who are brought into the rubber fields from the coast do not average more than three years of life, and are, if not in law, at least in fact, subjected to hardships never known or endured by the slaves in the United States, or even by the slaves in the coffee countries of Brazil. The greed of man as expressed in terms of rubber has proved itself almost fiendish, and the requirement for this necessity of life probably holds more men to-day in abject and irremediable slavery than any other field in the world's work."

APICULTURE.—Though by no means the first bee enthusiast in Natal, Miss Ada Pullinger may perhaps claim to be the first to go in extensively for apiculture, having just established an apiary on a business scale on the South Coast, at Umkomaas. We learn from the *S.A. Poultry Journal* that Miss Pullinger started bee-keeping at Malvern some two years ago, and has become more and more interested in bees ever since. Leaving some hives at Malvern to look after the mango and orange blossom, Miss Pullinger has removed the larger number of colonies to Umkomaas. After the preliminary work of clearing the undergrowth (leaving the taller trees to form sufficient shade for the bees) on a hillside overlooking the river and but a short distance from the station—the site selected for the establishment of the apiary—the more or less difficult task of moving the bees was performed, safely but not without adventure. The first ten hives passed Sea View in safety, but before South Coast was reached the bees had become restless; they objected to the flitting, we are told, and maligned the N.G.R. in the conventional way; and "by turning their bodies sixteen times with a screw-like motion they found they could force an entrance through the perforated zinc." Difficulties ensued; but finally muslin covers were adjusted, and Umkomaas was reached at night-fall. Practically all the honey, Miss Pullinger explains to visitors, is for Johannesburg; she has no intention of placing any on the local markets. It would be interesting to see such an industry firmly established here on really profitable lines and on a large scale; and the good wishes of our readers will surely accompany Miss Pullinger in her efforts to prove that apiculture can be established in this country on a successful basis.

BANANA CULTIVATION IN EGYPT.—According to an article in the *Gardener's Chronicle*, growers of bananas in Egypt rarely realise less than £60 clear profit per annum per feddan (a little over an acre); and from one plantation of 25 feddans in the Province of Galoubieh, the owner has this year made a profit of over £2,000. Yet many bananas are yearly imported into Egypt; and there is an argument additional to that of the existence of a home market, for the institution of a banana industry in that country, namely, that Egypt is more favourably situated than any other country for a banana trade in the Mediterranean, Adriatic and Black Sea ports. The Chinese banana, which fetches the highest price in the European markets, thrives "exceedingly well" in Egypt, and bears crops equal in weight to any produced in the West Indies or Canary Islands. Clumps planted ten feet apart annually produce four bunches of fruits containing from eight to ten hands each.

A JAM FACTORY FOR ZULULAND.—A laudable project, and one deserving of a full measure of support, is that brought forward by Mr. W. A. Vanderplank at a meeting of the Eshowe District Farmers' Association held on the 29th July, for the establishment of a jam, canning and preserving company on co-operative principles. Mr. Vanderplank's proposal is to form a co-operative society with a nominal capital of £4,000. On this capital a call would be made of 2s. 6d. per £1 share, providing cash to the amount of £500, and leaving a liability of £3,500 on the shares. Government should, Mr. Vanderplank suggests, be approached to make a loan of £1,500, taking as security the Society's plant, etc., with further security of the £3,500 uncalled for capital. In its early stages the factory would deal chiefly in small fruits, such as Cape gooseberries, grenadillas, guavas, raspberries, citrus fruits, pineapples. These are all growing in the district, it was stated, and would provide something for the factory to go on with. Fruit should be grown and supplied to the factory, Mr. Vanderplank suggests, at an average price of about 1d. per lb., which would mean £9 6s. 8d. per ton of 2,240 lbs. All members of the society should undertake to grow a certain quantity of fruit during the ensuing season. "The undertaking," Mr. Vanderplank says, "would be a modest one, within our means and suited to our soil and climate. It will open up a field for numerous small cultivators and enable the man with a few pounds capital to make his living off 10 acres of land. Advantages would also accrue to the town which, if they were too small to make any difference in a big city, would certainly be felt in our small community." After the reading of Mr. Vanderplank's paper, Mr. H. C. Hulett proposed, seconded by Mr. Thole, "That a preliminary committee be appointed to go into the matter and report to the association." This was carried, and the following gentlemen were chosen to constitute the committee:—Messrs. W. A. Vanderplank, G. H. Hulett, Dr. G. K. Moberly and Mr. T. Parkins,

THE GOVERNMENT ABATTOIR.—The abattoirs which were erected recently by Government in Maritzburg to deal with cattle from East Coast Fever infected and other areas, are apparently turning out the success which was anticipated. Mr. A. R. Burford, the manager of the Abattoir and Cold Stores, informs us that between seven and eight hundred cattle were dealt with during July, besides numbers of sheep and pigs. Consideration has, of course, to be taken of the fact that the winter is well advanced, and that, at this time of the year, even in normal times prime cattle are comparatively scarce. Yet, in spite of this, large supplies of cattle are coming forward; and Mr. Burford anticipates that an even larger number will have been dealt with by the end of the current month. A pleasing result of the existence of these abattoirs and the facility they give for the clean and satisfactory handling and despatch of slaughter cattle, is the fact that there is now practically no imported beef on the Natal market. The quantity of imported beef consumed in Natal during the past six months has been very small; in fact, Mr. Burford feels certain there is little or none of the imported article in Maritzburg at the present time, and only a small quantity in Durban; whilst in the country towns it is unknown. Questioned as to the effect upon the market of the present system of wholesale slaughtering, Mr. Burford states that beef of fair quality is realising reasonable prices, and that there is, as yet, no slumping effect apparent.

N.S. WALES AGRICULTURAL STATISTICS.—Preliminary tables dealing with the agricultural and live stock statistics of New South Wales for the year ended March, 1907, have just come to hand. The total area under all crops is returned at 2,826,617 acres, which, although a decrease of 13,618 acres as compared with the acreage of the previous year, is an increase of 1,004,788 acres since 1898. Nearly 34 per cent. of this area was under wheat (for grain), 1,866,253 acres being devoted to that crop. Maize monopolised 178,197 acres. Lucerne was planted to the extent of 45,964 acres. There were 4,942 acres of grape vines for wine-making purposes, and 2,912 for table use. The average yield per acre of mealies is given as 30.9 bushels, that of wheat 11.7 bushels, oats (grain) 24.9 bushels, oats for forage 1.4 tons, barley for forage 1.4 tons, lucerne 1.9 tons, potatoes (early crop) 2.6 tons. For the purpose of comparison with Natal yields of some of these crops, the reader is referred to page 774 of last month's *Journal*. At the end of 1906 there were in the State 537,427 horses, 2,549,758 cattle, 44,132,421 sheep, and 243,370 swine. During that year 57,477,000 lbs. of butter were turned out, as well as 5,375,000 lbs. of cheese and 11,823,000 lbs. of bacon and hams. There are 37,306 productive, besides 11,964 unproductive bee-hives in the State; and the quantity of honey produced during the year ended March, 1907, was 1,907,744 lbs., the average yield of honey per hive being 51.1 lbs. In addition 34,690 lbs. of beeswax were produced.

THE WORLD'S TEA CONSUMPTION.—Messrs. Brooke, Bond & Co., the wholesale tea dealers, in their report upon the consumption of tea during the past year, state that the consumption has increased during the year in the United Kingdom as well as abroad. The habit of drinking tea is certainly gaining ground, they remark, on the Continent. In the fashionable watering-places in France, tea is to be had at most of the confectioners' shops, and is drunk not only by English and American visitors, but also by the French. Imports into Germany have increased after the duty was reduced in March, 1906. Tea seems to be steadily growing in favour in that country and becoming part of the regular dietary. In many families it is always served with the evening meal. Imports of British-grown tea into Russia increase steadily. This is entirely owing to the good quality of the tea and to the enterprise of British dealers who, in spite of all difficulties, have kept their tea well before Russian blenders. The United States took more British-grown tea last year, though imports of all teas fell below those of the two previous years. Indian and Ceylon teas are being very well advertised in various ways—by sampling, by the establishment of tea-rooms, by newspaper advertising, through the post, by assistance given to charity bazaars, and in other ways—with satisfactory results. Consumption also increased last year in Australia, New Zealand, South America and other parts of the world.

THE ARBOR DAY MOVEMENT.—The Arbor Day movement is one that has excited little interest—even if its existence has been at all widely known—in Natal. In Cape Colony and the O.R.C. an annual arbor day is recognised and the occasion is made a general holiday. Apart from the good such an annual observance does in the direction of the inculcation of a certain love of nature in the minds of children, there is a national benefit which is to be derived from an annual planting of numbers of trees in the various towns, villages, and districts of a country. Mr. Sim's paper on "Man's Influence on Climate" in last month's *Journal* brings forcibly home to us the value of afforestation, and the necessity, not only for the judicious conservation of such bush and forest as still remains to us, but for the setting aside of fresh areas of forest trees. The adornment of our streets, our farmsteads and our landscapes with carefully selected trees will have more than an aesthetic value: they will have a highly beneficial effect upon the general climatic conditions of the Colony in the future—an effect that must be recognised as a most important one not only by agriculturists but by all sections of the population. We commend the matter to the consideration of agricultural associations. In concluding a statement on Arbor Day which he has recently issued to the school children of the United States, President Roosevelt says: "A people without children would face a hopeless future; a country without trees is almost as hopeless; forests which are so used that they cannot renew themselves will soon vanish, and

with them all their benefits. A true forest is not merely a storehouse full of wood, but, as it were, a factory of wood, and at the same time a reservoir of water. When you help to preserve our forests, or to plant new, you are acting the part of good citizens. The value of forestry deserves, therefore, to be taught in the schools which aim to make good citizens of you."

CO-OPERATIVE MARKETING.—History repeats itself, indeed. What has happened—and, for that matter, is happening now—in Great Britain with regard to foreign competition in food supplies is to-day happening in Natal. Recently the *Natalian* called attention to the circumstance that Australian butter was being sold in the City at a lower price than the home-produced article; and the following week (2nd August) was "still further astonished" to find that butter from the Argentine Republic was being retailed here at 25 per cent. less than our Natal farmers can produce it. "What is the reason for such an extraordinary circumstance?" the *Natalian* asks. "If there are any two items in our domestic economy which we should, under no circumstances, have to import, butter and milk are surely those two items, and yet we find that condensed milk and foreign butters are the rule, instead of the exception, at our breakfast and tea tables. Instead of importing them, Natal should be exporting such articles, and our farmers should blush for very shame at seeing such items in our lists of imports." It is, certainly a strange situation, but it may be described in brief as a result of individualism. It is want of organisation on the part of the producer that has brought about here, as it has done under very similar circumstances in England, such a state of things. How can any reasonable producer ever hope, in these days of competition, to profitably market his stuff when he ignores the very existence, economically, of his neighbours, and consigns his butter or his eggs to town in such absurdly small quantities as is the present vogue? Overseas, by combination, proper grading and packing, and marketing in large quantities, and by carefully studying market and other conditions, farmers are in a position, not only to supply the local demand, but also to place their products on our own markets at a price that will successfully compete with home-made stuff. This is obviously the condition of things. Man for man, our farmers are at heart no more backward, than those of other countries; and the prosperity which characterises some other countries is not the result of any extraordinary amount of individual genius on the part of the farmers, but is more likely the outcome of a set of economical and other conditions that have, in the case of Natal, either been absent or whose good effects have been nullified by other sets of conditions acting in contrary lines—instance our famous stock diseases, and locusts and other insect pests. It is co-operation that is wanted; and that is the answer to the *Natalian's* question, "What is the reason for such an extraordinary circumstance?" We can do little—save by protective

duties or a system of State bounties, neither of which is feasible at the present time—to undersell foreign butter and milk, not to mention other commodities, until our farmers grasp the significance of the fact that co-operative marketing is the only practicable means of supplying the home demand with home produce. Following on the experience gained in the adoption of such methods should come a large and increasing export trade. We may fittingly conclude with the final sentences of the *Natalian* article: “There is a most extraordinary penchant among Natalians to buy from abroad, and so long as that tendency exists so long shall we remain an impoverished community. It is not only that we waste hard-earned money in this way, but we actually prevent local industry. Such items in our productive and industrial powers may be small, but we should remember the old Scottish proverb that ‘every mickle maks a muckle,’ and in every branch of commerce we should patronise our own productive capacities.”

EARLY-MATURED CATTLE.—What is termed “baby beef” has secured a firm hold on the United States market, as supplying the very best class of meat. The term is one given to early matured cattle thoroughly fattened and ready for slaughter at from twelve to twenty-four months old. The growth of such a beast is artificially promoted by continuous heavy feeding with the object of securing the maximum amount of beef in the shortest space of time. The principal advantages to be derived from the production of these early matured cattle are stated to be (a) the quick returns on the capital they represent; (b) the greater demand and better prices; and (c) the greater amount of meat produced per pound of food consumed. A Circular of the U.S. Bureau of Animal Industry states that early maturity is not so much a matter of breed as of type. Early maturity is generally found in animals that combine a good feeding and assimilative capacity with a certain fineness of quality. While early maturity is not entirely a matter of size, it is most often found in individuals a little smaller than the average of the breed. Good specimens have a compact form, fine bone, soft, pliable skin, and good digestive capacity, the latter being indicated by well-sprung ribs, great depth of body and wide chest. With regard to fattening, it has to be remembered that a calf cannot utilise coarse fodder to any extent during the first six months of its life, so that its food must be confined to milk and grain. Young calves which receive liberal quantities of whole milk make rapid gains and get very fat, and this fat is, on the whole, very economically produced; whereas calves that are allowed to get thin during the first six months of their lives generally require a long time to get over the check. Where early maturity is desired such a system would, of course, be disastrous. The fattening should begin with whole milk at birth and be continued until the animal is mature and ready for slaughter. It has been found most satisfactory to permit the calves

to run with their dams from four to six months. As the digestive system develops and solid food becomes necessary, grain should be added, the quantity being gradually increased so that when weaning time comes the change is less sudden, and a check in growth or a loss in flesh is less likely to occur. An alternative system is to allow the calf to run with the cow for several weeks, after which they are separated, the calf being allowed to suck three times daily and the cow stripped after the calf has had its fill. This permits a more gradual transition at weaning time, as one of the suckings may be discontinued when the calf is about three months old, another when it is about five months old, and the third when it is six months old, by which time the calf will have become accustomed to eat grain and to drink water. The calf can also be fed with whole milk from the pail. The calf should be so thoroughly accustomed to the use of grain when weaning time comes that milk can be discontinued without any check to growth. From this point the key to the successful production of early matured beef is to hold the flesh already gained and to continue its rapid and steady growth. To induce calves to eat the greatest possible amount and yet keep their appetite keen it is necessary to feed them regularly at stated times every day, as stock will become accustomed to eat at certain hours and will often come to the trough at that time through force of habit, though they may not be particularly hungry. They should be fed more frequently than those nearly mature in age. The grain should be given in two or three feeds daily. If it is given mixed with chopped fodder, it is probably better to give three meals daily, but if kept on pasture two meals of grain is probably sufficient after the first six or eight months. Water and salt should be accessible at all times.

S.A. TOBACCO FOR NEW ZEALAND.—The *Transvaal Agricultural Journal* for July states that enquiries have been received from New Zealand for a good light grade of cigarette tobacco, packed in a suitable form for the retail trade. "There already exists a considerable demand for this from the various cigarette factories in South Africa," the *Journal* comments, "so that, with an evidently widening market, the cultivation of such a class of tobacco should be well worth the attention of planters."

A UNITED STATES ANT PEST.—In a circular issued by the Louisiana Crop Pest Commission, attention is called to the so-called "New Orleans Ant" (*Iridomyrmex humilis*, Mayr.), an introduced insect enemy that promises within a few years to do enormous damage to the agricultural interests of the State of Louisiana, and which at the same time is likely to present a difficult problem for solution. This ant is already a bad household pest in New Orleans and Baton Rouge, and has already spread to the towns of Alexandria, Lafayette and St. Charles, and to adjoining territory. It cares for and permits the increase of almost

every species of plant louse and scale insect, and, as the indirect result of its presence, thousands of trees and plants in the City of New Orleans have already been killed. Moreover, the ant does not confine itself to facilitating the increase of other injurious insects, but is itself injurious. During the present spring it has destroyed the entire prospective orange crop at Audubon Park, by eating the fruit buds, and last year it was the cause of heavy losses to orange growers in various parts of the State. It is also guilty of causing the increase of an insect very injurious to sugar cane, a species of *Dactylopius*. Unless measures are found for the control of this pest, the orange industry of the State, it is said, is doomed; and eventually the success of the sugar cane industry is likely to be threatened by it. All fruit industries will suffer from its presence. Further, as it destroys or drives out all native species of ants, its appearance in the cotton fields is not unlikely to result in increased damage by the boll weevil, for the most active enemy which the boll weevil has in Louisiana is the small "fire ant" (*Solenopsis geminata*, Fab., var.), and the latter may possibly be exterminated or driven out by the "New Orleans ant."

SOUTH AFRICAN PRODUCTS IN ENGLAND.—The Secretary of the Capetown Chamber of Commerce (Mr. E. J. Cattell) has forwarded to the *Cape Times* a letter from Messrs. H. E. Jones and Albert Douglass, the joint managers of the Liverpool Colonial Products Exhibition, regarding the placing of colonial products on the English markets. The letter, which may be of interest to readers of the *Journal*, runs as follows:—"Judging by the phenomenal success of our four exhibitions of Colonial produce in Liverpool, we have come to the conclusion that with judicious handling there is a much improved demand for Colonial goods, which can be brought before the citizens of Great Britain at a competitive price. We have for many years advocated through the press of this country a greater measure of support for commodities supplied by Colonial houses, and we are of opinion that the time has now arrived when a remunerative market can be secured. We are so strongly of this opinion that we are open to accept agencies for Colonial houses in Great Britain on equitable terms, and shall be pleased to hear from any of your members or traders in your Colony who are anxious to open up or extend their trade in the United Kingdom. We would ask them to send us full particulars, also samples of their goods or manufactures, and to state at the same time the best terms they are prepared to offer, so that we can go into the matter very minutely, and advise them as to their prospects of business. We shall be much obliged if you will assist us in this national undertaking, by giving the contents of this communication as much publicity as possible." The offices of the Liverpool Colonial Products Exhibition are situated in 14, Dale Street, Liverpool. The patron of the Exhibition is H.R.H. the Prince of Wales; and the President is Sir Alfred L. Jones, K.C.M.G.

S.A. Produce Exhibition, 1907.

REPORT ON THE NATAL EXHIBITS.

CONDITIONS ESSENTIAL FOR SUCCESSFUL EXPORT.

Mr. T. R. SIM (Conservator of Forests), who represented Natal at the recent South African Products Exhibition in London, returned to Natal towards the end of May. The following is his report to the Minister of Agriculture.

After discussing the arrangements for holding the Exhibition, and similar matters, Mr. Sim goes on to say:—

· Taking the Exhibition as a whole, Natal held its place creditably. The space allotted to Natal and the Transvaal together was equal to that held by Cape Colony, Rhodesia occupying a semi-detached room near Natal, while the Orange River Colony had a similar annexure near Cape Colony. The products of any one Colony were kept together, consequently grain, wool, fruit, tobacco, and each other general product was to be found in five different parts of the Hall. The judges and experts usually reported on the merits and comparative value of the exhibits of each Colony separately at first, and then in comparison with those of other Colonies. In view of the expected publication of their report, it would be out of place for me here to give any indication of my own opinions further than to say in general terms that the produce more or less fits the London market, but the expected price does not. London is the great leveller of prices for goods from all parts of the world, and until senders are prepared to accept London prices there can be nothing but disappointment, in sending goods there. For instance, the mealies shown by Mr. John Moon and Mr. Bosse were much admired, and large sales could have been effected on these samples at London price, but that at the time was about 21s. per quarter (480lbs.), or, say, 8s. 10½d. per mu'd delivered there in full 4-bushel bags, while there was an evident dread that stock might prove not up to sample, pit mealies and mealies subject to weevil being refused almost at any price. So also with tea, sugar, syrup, meal, arrowroot, monkey-nuts, castor-oil, beans, cheese, butter, etc.: each was in demand at London price, but in each case that price was lower than the price current in the Colony, and consequently not up to expectation. So long as the demand in the Colony or in South Africa is sufficient to absorb all the produce grown of any particular article, the market for that article is evidently local, and the best price is likely to be in the Colony. This was fully recognised by the Natal Government when at first it declined to take part in the

Exhibition on the ground that the Colony is not yet in the position to offer produce in quantity abroad, except mostly in the lines in which regular channels of export already exist. But, lest absence should give the impression that Natal *could not* produce, it was finally decided to take part, and to show that Natal is capable of producing a vast variety of articles, in really good form; and that the extended culture of these for local consumption is likely to be remunerative (since local prices rule high) until over-production for local supply ensues, and that even thereafter a less fluctuating value, based on London price, is assured, which is as likely to be profitable in this Colony as in other producing countries, if systematically worked with best kinds and methods.

And in this respect participation in the Exhibition has been fully warranted. The Natal display was greater in variety than that from any other Colony, because inclusive of tropical coast as well as up-country produce. This, too, was made up of staple products, and was almost clear of the misleading little exhibits which can only be produced in small quantity, or for which the world's demand is likely to remain insignificant. The individual exhibits were also fairly representative of what Natal can produce under present conditions of culture and treatment, and were not specially worked up for exhibition purposes, consequently criticism contained in the reports may be accepted as fair criticism on Natal's whole product of that kind, as viewed from the London point of view. The only cases in which this comes to have comparatively little value is in reference to such products as timber, etc., which are never likely to be shipped thither, and concerning which the experts frankly expressed their inability to do other than give a general opinion on suitability for English work in special lines, of the kinds submitted, and that it was beyond their scope to deal with African uses or values for local utilisation.

Some points of interest brought out in general conversation with the judges and experts may, however, be worth mention. For instance, in regard to

NATAL TEA.

This came as a surprise alike to Mincing Lane men and to the public. They had not previously heard of Natal tea, and were exceedingly surprised at the quantity produced, and at the progress the industry is making. And though, as critics, they naturally felt themselves bound to express criticism on the product submitted, and to point out rather its faults and shortcomings than its perfection, they all admitted that the product was inherently first-rate, but that the treatment accorded was not quite that to which London was accustomed. Further, they appeared to agree, with so many degrees of classification as were represented from Natal, it would be useless to attempt bringing Natal tea before the public under that name unless many thousand tons of each grade were available, its present use being rather for blending with other teas so as to produce a uniform quality maintainable in quantity at all times.

This then involves selling bulk into the hands of blenders rather than the establishment of agencies at which the maintenance of an adequate supply of any brand would be a difficult matter at present.

In regard to

SUGAR,

it was pointed out that the buying public take no interest whatever in whether sugar is the product of beet or of cane, and consequently the beet sugar rules the market, and the products sell on nearly equal terms. There was an objection raised, too, that all the ordinary crystallized sugar shown from Natal had a tendency to absorb or develop moisture, greater than that of Home-made sugar. Possibly this was a result of shipment.

In

TOBACCO

there was absolutely no enquiry for the rougher leaf-forms shown; not even for snuff or extract did they appear to be worth the duty. And further, in regard to the best, the Tobacco Expert declared that a great mistake would be made if South African growers endeavoured to sell in Europe both raw and manufactured tobacco. Either they should combine to export leaf only, allowing the larger manufacturers in Europe to manufacture and sell it, or they should combine to manufacture, ship, and sell, in competition against the world, all that they produce for export. Although there were good samples included, the Natal tobacco did not as a whole compare favourably with that from other Colonies, and some lots actually moulded so much that they had to be withdrawn, and were quite unsaleable.

In regard to

PRESERVED AND BOTTLED FRUITS,

the condition and preservation of these were much admired, but it was pointed out that, in some instances, in order to secure variety, fruits not in condition for preservation had been used, especially green fruits unfit to eat even after further cooking. If ever Natal preserved fruits are to take a place in the London market it is not a large variety that is wanted so much as large stock of a few of the varieties less easily obtainable elsewhere, and these put up only in the best possible condition for table use. In Holland, where a heavy duty on bottled fruit exists, it was suggested that the importation of such fruits in large barrels as a raw product, and its subsequent bottling, would not only escape duty but also save export and import of the bulky and breakable bottles. Cape gooseberry pulp, however, shown in bulk in England, found no demand, while the bottles were readily bought. In this, as in regard to every other fruit, bottles were in demand, while tins, even of the same variety and maker's brand, were not.

Enquiries were more frequent in regard to monkey-nuts than in regard to perhaps any other product, their use for the expression

of oil having apparently assumed large proportions, still the enquiry was constantly for the large nuts shown by Rhodesia in preference to the smaller nut from Natal. The large nut was new to me, and nearly twice the size of ordinary Natal monkey-nuts, but wherever they may come from the supply of these in the market is evidently large, as they were common in shop windows, especially in Holland.

Beans had only their milling value, except in the case of the few varieties for which a small seed-trade demand existed.

Castor-oil beans were in some demand, and there was a marked preference for the large beans shown by Mr. Wm. Cato from Hillary's, but, of course, in this Natal can only show samples as yet.

Natal butter was admired by the trade, and a demand for it by the ton at about 9d. per lb. was said to exist, the retail price of a similar quality being at the time about 1s. 1d. to 1s. 3d.

The Native curios, strangely enough, were not in demand at the exhibitors' values, and with these, as also in regard to horns, skins, etc., wholesale men showed one that they were able to buy in bulk from country traders in South Africa at exceedingly low prices, the trader evidently making his profit off the native truck rather than off the Home deal..

Fibres will be dealt with in a separate report, so are omitted here.

Natal grain was admired, but, with the exception of mealies, it was not fully understood, and experts declared themselves unable to say anything except as bird or fowl feed in regard to kafir-corn, millets, buck-wheat, sunflower seed, etc., though for the sunflower seeds the oil-expressers were prepared to quote if thousands of tons were available.

This demand for

LARGE CONSIGNMENTS

appeared to be a feature in everything; experimental lots were not in the line of the wholesale men, and they must either buy enough to make a thing a leading line or keep off it altogether. Hence exists the greatest difficulty in getting an innings in regard to anything. The whole machinery of commerce in London appears to be like a very large fly-wheel, requiring an immense pressure to get it into motion in regard to any one article, but once started giving impetus to everything connected with it. And, until Natal has volume in leading lines, sufficient to attract attention and ensure permanent and regular supply, no endeavour need be expected from the London end to attract Natal's small surplus quantities; these can only be dumped in London like other surplus lots, and realise as much below London price as the absence of a known name and the absence of due advertisement are likely to fetch. But it is not the man who feels discouraged by this and at once withdraws who is ever going to succeed. If his article has intrinsic value in it, and is methodically placed there every season in some quantity

and under the same brand, even at a loss, it will sooner or later attract attention as a constant factor, and secure its place at its *actual value* there. Efficient advertisement is enormously dear in London; business without advertisement is equally expensive and even less satisfactory; consequently volume and quality are both necessary in anything which is to succeed.

PINEAPPLES.

I have as yet only barely mentioned the fruit sent to the Exhibition, but may be allowed to say more on that than on other subjects which do not come so much within my own province. Natal pineapples were made a feature of the Exhibition, and, so far as Natal is concerned, are not unlikely to leave the greatest permanent improvement in oversea export occasioned by the Exhibition, at least in so far as immediate effect is concerned. But even in that line the exhibits were not up to my expectation. When I met the Natal Fruit Growers' Association at Durban with a view to getting up exhibits I laid down as a standard that Queen pines sent forward should not be less than 3 lbs. in weight, and Smooth Cayennes considerably more. Later it was found that if this were adhered to there would be only a few dozen Queens forthcoming. But it was desired to show in quantity, and on purpose to allow this smaller sizes were accepted, growers being expected to send the best they could, while an arrangement was made with one syndicate that they would send forward 50 tons measurement of pineapples, for exhibition and sale by their own representative, the size to be, if possible, 2 lbs. weight or over, while, on purpose to popularise the fruit in London they were limited to a selling price not exceeding 4d. per lb. It was then exceedingly disappointing to find that though 70 or 75 tons' measurement altogether were sent forward very few Queens were over 2 lbs. in weight (and these mostly from the Government Experiment Orchard, Winkel Spruit), while many were nearer one pound in weight, and even among these all stages of ripeness came forward, including quite green pines per cold chamber, in spite of my advice to send only one degree of ripeness in one case, and only full-ripe pines per cold chamber, and well-coloured pines as deck cargo. Cases also contained large and small mixed indiscriminately, and even some which had been evidently damaged before being packed. So long as this indiscriminate mixture of various size, quality, ripeness, and condition is allowed to be shipped, all shippers may expect the value of even good consignments to be regulated by the worst. Some senders' lots were uniformly poor and unsaleable, and the only large lot which could be described as uniformly of good quality and well packed was that from Winkel Spruit. These were packed about 9 or 10 in a case 12 inches by 24 inches by 6 inches, and were each wrapped in tissue paper, and packed lightly with medium wood-wool, some cases being sent in cold chamber and some on deck for comparison. The first consignment went per "Durham Castle," by

which I also travelled, and I had opportunity of watching the deck consignment on the way. They were placed on the navigation deck, in the best possible place on the ship for cool open-air treatment, and protected from bright sunshine, so I do not think that under any circumstances pines could have better treatment as deck cargo, while if in large quantity the treatment could not be so good. These, when opened, were found uniform in having the pine itself in quite good but very fully ripe condition, while the crown had lost its appearance through every leaf being more or less withered and flaccid, the lower leaves being more and more so and the neck of the crown soft and rather flabby. As table ornaments their beauty was gone, and since it is quite as much for centre-ornament as for eating that pineapples are usually purchased their value for that purpose was also gone. For eating purposes they were quite fit during the first two days, but thereafter rapidly blackened in the centre and also in some of the pips.

The consignment sent per cool chamber in the same steamer arrived in excellent condition throughout, the fruits being crisp, plump and fresh, the crowns erect, firm, and undamaged, and the whole appearance attractive and quite fit for table decoration and for table use. Subsequent consignments from Winkel Spruit all bore out this experience, and consignments from other sources confirmed the same in so far as they lent themselves to comparison. In every case deck fruits were easily recognisable, and when exposed for public sale by auction in Covent Garden they brought about 3s. per dozen, as against about 6s. per dozen for those from cold chamber, only with this difference, that the latter appeared to be always saleable if sold on arrival and in good condition, while the former were a doubtful sale at any time. The only other pineapples meantime in the market are from the Azores, and are of a much larger pine, 4—6 lbs. in weight, of very high-shouldered form, reddish-brown colour, firm consistency, fair flavour, quite flat scales, and small crown, and altogether a pine of better appearance than any we have in Natal.* They are supplied in fair abundance, in crates of 6 to 10, those in a case being uniform as to size, ripeness, colour, crown, etc., and every pine is ready for eating as passed through the sale-room. No defect of any kind was observed on any Azores pineapple offered in Covent Garden, and every case was fully open, and fit for close inspection before being passed through the ring. The price of these ranged from 2s. to 4s. per pine, and in the retail shops the price for the same fruits ranged from 3s. to 6s. each. These prices confine the use of pineapples to the wealthy, and limit the demand very considerably. It was hoped that the Natal pineapple, at a price which allowed even the working man to purchase, would be in large demand. No doubt so it will in time, but it must be remembered that this was supplying a new

* Plants of this pineapple were imported last year and are now being propagated at Winkel Spruit.

article to a class of customer who had not previously tasted it, and who has, all the year round, an abundant supply of well known fruits at reasonable rates. The taste for pineapples is more or less an acquired one, and it has still to be acquired by the middle and working classes of England. To assist in this the supply of pineapples belonging to Government were distributed judiciously and without charge whenever it seemed likely that sampling advertisement would be effected, and only in a few cases were these offered for sale in Covent Garden, and that rather to test the market and the methods of handling than with a view to realisation, except in regard to unsatisfactory deck cargo. It was surprising how many channels could be produced through which the increase in popularity of Natal pineapples by gratuitous distribution was recommended, and if the London public have not now acquired a taste in that direction it is not for want of opportunity.

The pineapples sent forward by private exhibitors were generally unsatisfactory, and the special methods of packing were all found defective, and the grading very bad. This is a matter requiring Government supervision if the trade is not to be ruined by the less scrupulous. The Smooth Cayennes were better, but, unfortunately, the best lots were all packed in mealie husks, which either had not been dry enough or had absorbed moisture from the pines or from the cold chamber. In any case the result was that the pineapples were mildewed past redemption. In a few instances in which they were not mildewed they did not compare favourably either in colour, shoulder, flatness of scale, or general appearance, with the Azores pines of similar size. They are consequently less suitable for table decoration in the houses of the wealthy, and still too expensive for the poorer. For the present the best market for these is in South Africa, and, taking the whole pineapple question broadly, my recommendation is to continue sending in quantity *the best only* of the Queen pines, to send these per cool chamber, to adopt the Government method of packing and size of box, and to use the Cayennes and small Queens rather in South Africa than in England, but meantime to work up a stock of the Azores pine for London market, and in regard to all kinds to adopt methods of culture and manuring which will ensure larger and finer pines than those meantime produced. Along with all this must be the abandonment of expectation of *extraordinary* prices; it is a large, steady, honest trade in finest fruit at natural market value that is going to pay. At present rates of cold chamber freight, 2 lb. pines cost 3s. per dozen for freight and allied charges, and it is a reduction on this rather than lowering the cost of deck freight that is to do any good. I should say, place no confidence at all in deck transport, for though under this treatment the fruits arrive fit for pulping, preserving, or making essences or syrups, they arrive only in lowest marketable condition for market purposes, and must detract from the sale value of every better consignment. Many, indeed, sent as deck

cargo, arrived only in condition for the refuse heap, and this was the general condition of the pineapples sent from Albany, Cape Colony, which were altogether an inferior lot, badly handled, and unfit for exhibition.

Those sent forward by the Natal Fruit Export Association were mostly in cases 36 inches by 14 inches by 12 inches, containing about two dozen, packed in an upright position, and with inch stalks sealed with sealing wax at the end. The long stalks and the sealing wax were valuable features; generally, the fruits were in good order if sent per cold chamber, and only fair or worse if sent on deck, but the worst feature was that the cases had no marks by which the top could be identified, and in many instances they had travelled upside-down, with the result that what would otherwise have been fine crowns were utterly ruined. The representative of this Association has promised a separate report on his experiences, which will be awaited with interest.

In regard to other kinds of fruit, it has already been mentioned that the main supply from Natal was sent in time to be on exhibition February 13th, and that the actual opening only took place February 23rd. This was disastrous. The fruit was taken out of the ship's cold chamber about February 6th, and, as no cold chamber was available at the Exhibition Hall until after the opening, it had to be kept as well as the accommodation in the Hall and cellars would allow. It would have been better to have marketed all on arrival, but as no large succession consignments had been promised it was decided to keep all, if possible, until the opening date, or later. Condition varied much, even on arrival, and a few days' storage and exposure did not improve matters. By the opening date, little of it was in good exhibition form, while practically all had gone past the marketable stage, and as it was then unfit to distribute as samples of Natal fruit what was unfit for the Exhibition tables was sent to the hospitals, or destroyed.

It may be remarked, however, that the condition on arrival was as follows:—

MANGOES.

Mangoes which had been shipped ripe per cool chamber were in excellent condition inside, but had a spotted or blackened surface which rendered them totally unsaleable. Kinds differed in this, however, the red kidney mango being still fit for table use, while the green kinds were much less so. And mangoes which had not been ripe when packed arrived in better condition externally but hard and still not eatable. Ripened gradually in the Hall a few of these were in good condition alike as to appearance, flavour, and consistence, on February 23rd and for a week afterwards; while a much larger proportion went wrong inside without ever ripening, but had good exterior appearance. If ever a trade in mangoes is developed, it appears to me that it will have to be through sending fruits nearly but not quite ripe, and ripening them

in a tincially heated rooms after arrival, but this is a requirement for which the fruit trade is at present unprepared, and would require united organisation by senders to ripen their own fruit on arrival. They must also be prepared, at least till much experience is gained, to save only a small proportion of the fruit sent. It has also to be kept in mind that the demand is limited to the comparatively small number of Anglo-Indians resident in London, and these not of the *very wealthy* class, but still accustomed in India to the finest varieties of mango grown there, with which our Natal kinds do not compare favourably. The continued importation and propagation of best kinds, and continued experiments in shipping what we have, are necessary.

PAWPAWS.

Pawpaws arrived in splendid eating condition, and were much enjoyed by all who tasted them, most of whom had never tasted them before, but the skin was in every case damaged by mouldy blotches, and the appearance rendered them quite unsaleable. I do not despair of being able still to bring about an immense export trade in pawpaws, and think it likely that further packing experiments, and possibly the use of formalin as a coating, may do much towards ensuring their arrival in good condition and with sound skin.

BANANAS.

A few bananas were sent forward, packed mostly in hands. In every case the skin was quite black and unsaleable, while the fruit inside was in nice condition for eating. In view of the abundant supply of bananas which arrives in splendid order and exceedingly low prices from the Canaries and elsewhere, and hung unpacked in the fruit steamers from the West Indies, I do not think that the export of bananas from South Africa to Europe can ever pay, or should ever be attempted. The beautiful condition in which these West Indian bananas arrive and are distributed should, however, give us hints as to their transport from one part of Africa to another. The blackened and damaged bananas which are so common even in Durban and Maritzburg, and which are the usual condition in Johannesburg, East London, Port Elizabeth, and Capetown, are no credit to our transport arrangements, and can surely be improved on.

Avocado pears arrived fairly fit, though more or less spotted, and are almost unknown in London, and not likely to take on largely at once even if sent in good order.

GRENADILLAS.

Grenadillas arrived mostly shrivelled, and in no case attractive. Worse than this, it was found on opening that the juice had mostly disappeared, and that the contents of each were less than a tea-spoonful, mostly of seeds. Grenadillas may be much enjoyed by those who know

them, but there is nothing attractive in a withered up greenish fruit, containing practically no juice and only a small quantity of pulp and seed of unfamiliar and rather unpleasant flavour. A better grenadilla, under the name passion-fruit, arrives in small quantity from the Canaries and the Mediterranean; it is considerably larger than ours, has a bright yellow colour, arrives plump and firm, and with a full supply of pulp, similar in flavour to ours. There is a limited demand for that fruit among those who know it, and I have arranged for seed to be sent here for growth in Natal for local use. But whenever a large supply arrives in London the first few cases sell, and the balance are quite unsaleable.

After the Exhibition closed a considerable consignment of Natal grenadillas arrived from Nel's Rust, which brought no bid either in the private sales or public auction of Covent Garden. On the same day a tinned consignment from Australia of a larger grenadilla, plump and firm, was equally unsuccessful in regard to sale, and I predict that grenadillas as fruit will not form a Natal export. It is possible, however, that the contents of the fruit, barrelled in bulk, may eventually be in demand for bottling out.

The few Natal oranges and lemons present at the Exhibition arrived in fair condition and helped to eke out the otherwise small show of Natal fruit.

In regard to

HARDY FRUITS,

it is a pity that exhibitors could not have been present in a body to compare their own with that from Cape Colony. I suggest, as a next best method, that a full exhibition of Cape fruits should be held in Maritzburg next season, and that all Natal fruit-growers should be encouraged to attend. In this at least the Cape is miles ahead of Natal. The kinds, the grading, the selection, the cases, the packing, the marking, and every other particular, is the result of many years of experience all directed toward the London market, and Natal, if so inclined, can benefit immensely by all this experience, without repeating all the experiments. The Cape Fruit Export Association now requires inspection, at the wharf, of all fruit exported under its aegis, and the only weak spot in this appears to me to be that it is not a compulsory Government inspection, and consequently that growers can ship any trash outside the Association, and thereby give the Cape a name abroad for a lower grade than its best. But the material which arrived at the Exhibition and also at Covent Garden, many thousand cases at a time, was simply grand, and many English growers informed me that even during the best English season it was difficult to bring together such a fine exhibition of Home-grown plums, peaches, apricots, and pears. Apples were much less satisfactory, usually showing a certain amount of spot (Bitter-pit). In regard to this trouble, which is not unknown in England, Mr. H. T. Gusson, who has been investigating the subject

closely, has arrived at the conclusion that it is not due to fungoid trouble, but that it is caused by want of nutrition while the fruit is quite young, causing the breakdown of certain cells or groups of cells, which thereafter remain undeveloped and cause local trouble. He attributes it usually, if not always, to want of water soon after the fruit is set, and holds that the cure is a cultural one instead of one by chemical sprays as has been previously held.

In regard to Natal hardy fruit, Satsuma plums were undoubtedly the best. These arrived from various growers and under various methods of packing in fairly satisfactory condition. But the size was not up to the Cape standard, nor does the colour of the flesh commend itself for table use. Kelsey and other plums of that nature mostly arrived slightly over-ripe, and much below the Cape size-standard. The peaches forwarded would generally have been no credit to Maritzburg market, miserable, spotted, uncoloured and flavourless clingstones and even St. Helena's being the rule. These were unsaleable at any price, unfit for exhibition, and unfit for giving even to the labourers. One lot of three cases were better than the rest, but even these, though pretty and attractive externally in appearance, were much under the Cape size-standard, and were found to be almost all wrong and subject to a dry brown decay internally. Pears also were unsatisfactory, except one lot which arrived after the Exhibition was in Holland, and which, though evidently fine fruits that had been in good form a few days previously, were then just too far gone to be saleable, though still fit for showing. Apples were poor throughout.

It is no wonder then that the judges, who did not see the main consignment of Natal fruit until little of it was left, found only pineapples that they could commend, while the public opinion of Natal fruit, apart from pines, was that it was poor. Those who know Natal, know that the display, after the Exhibition opened, was not representative of what Natal can do in the way of fresh fruit, and almost every Natalian present remarked that he grew better fruit at home in the Colony. But, the pity is, he neglected to send it forward. Now, those who sent forward consignments deserve every commendation for having done so, if they sent to the best of their ability. Still, if they did so, it only shows how very much has yet to be learned in Natal in regard to fruit culture and marketing. The work of those at the Government Cold Stores who censored and heavily thinned the consignment of hardy fruit must have been hard indeed, for on several occasions I was advised that they doubted the wisdom of sending forward *any* of the fruit sent in, and my impression when the best came forward and was shown in the same hall as the Cape fruit was that they would have done well to have condemned all. Had it been of any use I would rather have marketed all than retained it, but if there was one thing more evident than another it was that second-rate fruit was absolutely unsaleable either in Covent

Garden or anywhere else in London. Not a single case of second-rate fruit did I see in London except our own, and when on one occasion I got a coster-monger in to see if he would give *anything* for a lot he forcibly decline to take it away if given free. Among the hundreds of thousands of cases passing through Covent Garden—more every day than Natal produces in a year—absolutely none were offered in anything but the finest condition, and it was evident that where the transport could not be relied on to allow cases to open out as packed, re-packing on arrival was practised, removing all except the best. I trust, in dealing with the citrus fruits now going forward to London, this has been considered, for the fruit and the freight and the attendant charges are all alike wasted if this has not been done. In regard to

CITRUS FRUIT,

the finest oranges were being retailed at two to three a penny during February and March, but I was assured that in May and June good prices could be obtained if the material were good enough.

Large size, good colour, and absolute freedom from scale were the qualities sought after, external appearance being more considered than flavour, though that as well as thinness of skin and absence of rag and seed are, also factors. The market salesmen, who are accustomed to receiving oranges from all quarters packed in 2-compartment and 3-compartment boxes about 2 to 3 feet long, 15 inches wide and 12 inches deep, with curved lids, could see no reason for packing oranges in single-layer cases, and considered that the price of oranges was not likely, under any conditions, to warrant that. In regard to mandarins, they held that these should be packed in single-layer boxes, neatly done up like plums or raisins, and each fruit separately packed in named paper, or some in tin-foil for effect, and, of course, the same applies to naartjes. I mention these as their opinions, not as my own, but I quite recognise that established custom is more difficult to move in London than in the Colonies.

I have doubts also as to the suitability of deck transport for citrus fruits crossing the Equator, but this point will possibly be made clear by present consignments.

In regard to price, oranges are abundant and first-rate meantime for nine months out of the year, and it is only by coming in during the other three months that ours have a chance. But at that season other fresh local fruits are abundant and good as well as cheap, and it seems to me doubtful if prices much higher than ordinary citrus prices will be obtainable, the change to other varieties being more appreciated than the continuance of the staple. Senders must not be disappointed then if, for this year at least, prices do not come up to expectation, especially if senders are allowed to select for themselves, without other inspection, what they may send. Fancy prices are not to be looked for,

but if a market for increasing quantity, at Natal market rate, is to be found everyone should be satisfied.

In regard to the marketing of Natal fruit in London or elsewhere in England or Europe, it may be well for Natal growers to understand the arrangements for disposal as they now exist.

COVENT GARDEN.

Covent Garden market is the great distributing centre through which all foreign and much local fruit for consumption in London is passed, and much for the provinces also passes through the same channel. It consists of two separate markets, the one wholesale and by auction, the other both wholesale and retail, but usually without auction sale. The auction sale-room deals with most of the foreign fruit arriving in London, whether it afterwards finds its way into the other Covent Garden market or not, and much of this also finds its way into other wholesale and retail markets, such as the Spitalfields market in the East End, the Borough market on the Surrey side, or the Brentford market in the West. The Covent Garden auction-room includes about a dozen auctioneers' rostrums, at each of which, every morning, four or five auctioneers of their assistants are fully engaged, all this crowd of auctioneers yelling simultaneously as loud and fast as they can howl, and picking up bids from the most densely packed and strangely mixed crowd imaginable. This is the nearest approach to a complete Babel it is possible to produce, every language on earth being in use, besides much language which belongs to no language. But all is good-natured and orderly. Case after case passes up, appears for a minute, all four auctioneers on the rostrum yell at once, each searches his own share of the crowd for bids and adds them to those already bidden to either of the other auctioneers, down goes the hammer suddenly as soon as a bid is not forthcoming, and the case passed out of sight to make room for the next. Or, it may be, one is up as a sample of a dozen, or hundred, or thousand. But even then, and in any circumstances, every case has been open for inspection before passing up, and intending purchasers see to it that they know before-hand what cases they mean to purchase, and what price they intend to give, and none rely on inspection at the minute it is under the hammer, further than to identify the case by number and make sure it is what he is bidding for. But there are always those present in large numbers who select nothing, but who are ready, when any package comes up which bids show to have been selected by nobody, to buy it on its face value, judged at one glance, if they see that it is a bargain, and these buyers know that no auctioneer can afford to allow any package to pass through his hands which is not equal throughout to its surface appearance. Under this class of sale it is almost impossible for other than straight work to be conducted without an auctioneer soon being known and boycotted alike by sellers and buyers.

But, in addition to the auction sale, there are many wholesale Covent Garden fruit dealers who import or receive from abroad, and each supplies his own clients throughout the metropolis or throughout the country, doing all fruit buying for them, and purchasing at auction or elsewhere whatever these customers may require if they themselves do not hold in stock at the minute. Some of these have several branch businesses conducted separately, as, for instance, one branch conducting auction sales, another carrying on wholesale fruit trade, another retail fruit trade, another vegetable trade, another flowering plants and cut flowers, while yet another deals with horticultural sundries, such as baskets, punnets, labels, fruit-cases, wrapping papers, etc. Such a firm naturally can place within itself the requirements of almost any buyer or seller in the horticultural or fruit line.

There are also fruit factors, mostly wholesale merchants conducting other lines as well, who receive and handle consignments in bulk, but who have no market stand and often no display store, their method being to keep in touch with all markets throughout the country, know as far as possible stocks in hand everywhere, stocks coming on, and present and near future prices at each centre, and then on advice of a consignment coming on to them to place same either in whole or distributed wherever the best price is likely to be obtained. This is a business requiring a vast experience, and in such perishable business as the fruit trade requiring also a knowledge of the financial position of every customer throughout the country.

I have described the sale arrangements with such detail because Natal, like the Cape, has a tendency to expect a special agent in England to work miracles for them. I consider such a scheme ill-advised and likely to be disastrous, except under the strongest limitations as to duty. If such an agent, be his title Trade Commissioner or anything else, is, in regard to fruit, to take the place of the fruit factor above described, and is at the same time a man who has spent many of his recent years in South Africa, it is like placing an amateur in competition with the smartest Jews this world contains, and who have for their whole lives and sometimes for generations been accumulating experience in this line. Natural chances are all against success, while the chances of getting good sales to all the bad customers, leading eventually to tremendous losses are almost certain. There may be use for a Trade Commissioner, and there may be use for the Permanent South African Trade Office proposed at first in connection with the South African Products Exhibition, but it is certainly not in the direction above indicated, and I recommend that Natal take no part in maintaining it.

But as to what is to be done in regard to the selling of Natal fruit in England, that question is already before us; and, while many firms are willing to take up sole agency, and may be relied upon to act straight in that capacity, I cannot recommend the selection of one of these

either. As already mentioned, each has his own *clientele*, and the placing of all in one firm's hands only results in that firm's clients having the parcels divided among them, without outside competition. This is manifestly not the best method. But we already have the Agent-General, acting in all matters in the best interests of the Colony, and exceedingly careful that best results are always obtained, who is quite in touch with the Covent Garden salesmen, and especially with the auctioneers, and who can place any consignment with one or more of these as the extent and value of the consignment, and the previous returns from each auctioneer may warrant, receiving within a day or two market notes and cheque from each for the value realised, and able to place future consignments in accordance with these. This appears to me to be the simple solution of the question so far as Natal is concerned, and it will cost nothing additional to present expenditure, except possibly an additional junior clerk in the Agent-General's office as soon as the trade is found to warrant that. This does away with the probability of bad debts, and it ensures the *actual value* in London being regularly realised. The only question is whether inspection on arrival, repacking when necessary, and ripening up to sale condition in warm chambers should not be also taken in hand.

But in regard to the packing and forwarding of consignments much change is necessary. The Natal Fruit Export Association has done good work this year in organising the despatch of fruit in quantity from many sources. But it is somewhat doubtful policy for fruit-growers to allow a private company to monopolise the trade in this way. They have already allowed coolie traders to monopolise retail and local transport, and if they allow a strong company now to take up over-sea export for them they may live to rue it.

Of course, it can be pointed out that it was in this manner that the now vast fruit trade of the West Indies originated, but business instinct indicates that there is a danger in it. A co-operative union of growers, necessarily open at all times to all, and with stringent export regulations, preferably given force by law and protected by Government inspection, appears to me the most satisfactory solution. What has been done in Natal in this direction during my absence in England is unknown to me, but unless this is already arranged I consider it should be taken up at once. The weak point in the Natal Fruit Export Association's work was in allowing each grower to pack his own, without inspection until arrival in England, and without satisfactory means of identification even then. Some growers' consignments were absolutely disgraceful, others were highly meritorious throughout, and in some instances where such came on together and were delivered mixed, there was no difficulty in separating into original consignments by the quality or want of quality of the contents. Some of these senders, if acting under the laws of some fruit-exporting Colonies, would have been fined

heavily. Inspection on the ground, while packing is in progress, and the adoption of a Government stamp, is highly to be commended, if found possible. The lectures delivered every evening were well attended, and often crowded or overflowing, and the lantern slides illustrative of Natal and its industries, prepared by Mr. Allerston and by Mr. Watkinson (railway photographer), were highly appreciated, and added much to the interest of the Exhibition.

An important and vexatious point in connection with the Exhibition was that of import duty. Natal had to pay about £250 of duty on its articles sent to the Exhibition, the rate being the same as if the goods had come from any foreign country. Had all the articles sent forward by the five Colonies been given away gratis for the purpose of allowing the British public to test Colonial wares, these five Colonies would have had to pay about £1,000 for the privilege of giving these goods away. Of course, where goods are being sold, there may be reason to impose the same duty as other importers have to pay; but for gratis distribution, and for loss through pilfering or other means the case is different, and in any case the Colonies have some claim to preferential treatment as against foreign countries. In some articles where the actual value was low it was found advisable to give the goods away gratis in Holland, where the duties were low, in preference to risking sale in England at possibly less than the cost of duty. This question, and the necessary delay in obtaining refunds of British duty on material sold or given away in Holland or shipped back to Natal, has prevented the final closing of accounts so far, but in so far as practicable values realised have been placed, and early distribution will take place. Where duties are concerned this distribution must necessarily be delayed until refunds are adjusted.

The Exhibition, as a whole, has opened the eyes of the British public very much as to Natal's position and possibilities in the commercial economy of South Africa, for though most parts of South Africa were advertised by the Boer war, few of those who passed through that campaign had any idea that such a fertile country, and of such varied product, existed so close to the high-veld, with which alone they were familiar. Investment in the wattle industry is one sure outcome of the Exhibition; investment in many other lines is more or less assured; development of the natural resources of the Colony by chemical and industrial means has been the subject of many interviews and of several interesting reports; fair report and healthy criticism on many of Natal's products may be expected in the Reports of the Judges and Experts; an export industry in Natal pineapples has been given a most liberal start; immigration of agricultural settlers possessed of sufficient means to allow them to develop their holdings has been encouraged; and altogether Natal may consider that the £1,000 voted by Parliament in respect of the Exhibition has been well-warranted expenditure, and likely to give

very good results. But too much must not be expected immediately; it will take years to show all the results of this Exhibition; and probably many results at present undreamed of will show themselves in due time.

Further advertisement of the same kind after four or five years would undoubtedly do good, but I doubt the wisdom of any earlier attempt, and even then would recommend Natal to act alone rather than in concert with other Colonies. The present Exhibition has, however, been, as promised by Sir Peter Bam, thoroughly South African, and not representative of his Colony only.

T. R. SIM, F.L.S.,

Natal Representative to the S.A.P. Exhibition.

London, April 27th, 1907.

NOTE.—I find since my return that the Natal Fruit Export Company bought on the ground, and packed by its own agents, so the remarks regarding this association refer to its agents, not to the growers. In the case of all other growers the fruit was sent to the Government Cold Stores for Government to handle either in accordance with senders' instructions or as it required.

A correspondent of the *International Sugar Journal* states that a large meeting of the sugar planters of Mauritius was held on the 7th May last to petition the Governor to assist them in raising a loan of not less than £600,000, to be applied to the enlargement of their factories and the improvement of their machinery and estates. It is assumed that the amount would be raised in England, through the Colonial Office, at about 4 per cent.

The *Queensland Agricultural Journal* suggests the following "cure" for egg-eating dogs:—To cure a dog of eating eggs, draw the contents of two or three eggs by making holes in both ends, and fill in with a paste of some kind containing a little red pepper. Put these in the nests where the pup is accustomed to find eggs. Do not practise cruelty on the young brute by using a large quantity of pepper—a little will suffice to give him a poor opinion of eggs as a diet for dogs. Another good plan is to draw the contents of the egg, put some strong liquid ammonia into it, and close hermetically. The dog who cracks this egg will never crack another. The dose, moreover, will do him no harm.

Geological Notes on the Coal and Gold Deposits in Natal.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE.

By C. J. GRAY, Commissioner of Mines, Natal.

THE small patches of Prussian on the map exhibited* show the places at which coal seams have been opened. It will be seen that coal occurs in almost every part of the Colony. The seams are of two ages.

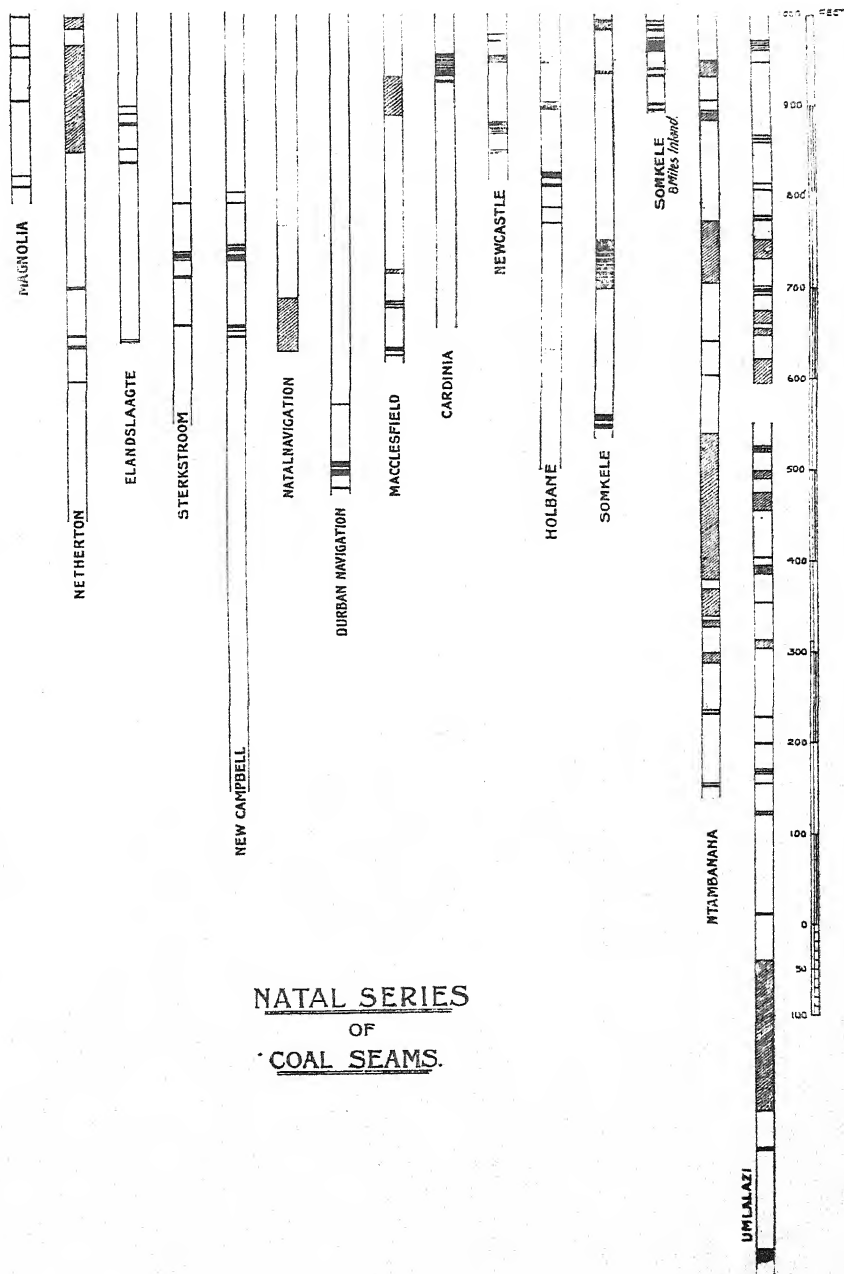
Mr. Anderson, lately Government Geologist of Natal, has pointed out** that the coal in the Drakensberg, in the Polela Division, being accompanied by a *Thinnfeldia* fossil flora, is of Stormberg age, and more recent than the other coals, which are with a *Glossopteris* flora. This Stormberg seam is about 5,750 feet above sea level. The actual coal, which is little more than 2 feet thick at the best exposures, is very bituminous near the headwaters of the Umkomaas, and there grades into bituminous shales, but it becomes more anthracitic and unaccompanied by shales to the southward. It is high in ash. The ratio of fixed carbon to volatile hydrocarbons at the Umkomaas is 1.2 to 1, and at Garden Castle 3.4 to 1.

Mr. Anderson classes the lower and far more important coal seams in the Ecca series, including in that term: the glacial Dwyka conglomerate; the dark coloured non-fossiliferous Pietermaritzburg shales lying immediately above the Dwyka; the light coloured shales and sandstones forming the upper portion of the Pietermaritzburg shales; and the still higher sandstones and shales containing abundant *glossopteris* and some reptilian remains in which the coal seams occur. The series is separated from the Stormberg beds by the Beaufort claystones, fine-grained sandstones and shales, containing more abundant reptilian remains.

It has been my practice to divide the series into three divisions, viz., the Dwyka, the Ecca shales, and the Natal Coal Measures; and I consider that those divisions should be recognised in all geological mapping and other geological work in the Colony. The divisions are distinct in petrological character, and for that reason can be readily distinguished in the field. The coal measure shales generally show remains of fossil flora, while the Ecca shales do not show such remains.

* Not Reproduced.

** 2nd Report, Geological Survey of Natal.



NATAL SERIES OF COAL SEAMS.

The lower of the two Umlalazi boreholes (shown on the extreme right) was misplaced when the original diagram was redrawn for the purposes of reproduction. The space between the two upper and lower boreholes should be approximately 150 feet instead of about 50 feet as at present shown. Allowance should accordingly be made when studying the levels of the strata.

The black portions of the boreholes represent coal seams; the shaded portions whinstone.

though in places they contain thin and valueless anthracite seams and graphitic beds. Even in hand samples the distinction can generally be made with some approach to certainty, as the coal measure shales are as a rule less dense in texture, and either more sandy or micaceous than the older shales. From the economic point of view, their recognition is of great importance, as the economic products, either minerals or building stones, of the different divisions, their characters affecting water supply, the soils resulting from their weathering, and their influence on topography, all differ greatly.

I do urge that the terms which I use to indicate the divisions are the best, or undoubtedly correct. The apparent absence of fossils in what I call the Ecce shales may indicate that the division is older than the Ecce shales of the Cape Colony, and would be more correctly termed the Dwyka shales. The shales, though nearly 1,000 feet thick at Maritzburg, thin out inland so that they are only a few feet thick, or, according to Dr. Molengraaf,* entirely absent, in some places near the northern border of the Colony. That thinning in some degree supports the idea that they are Dwyka shales, and is of interest in connection with the close association of coal seams with the Dwyka conglomerate at Vereeniging, in the Orange River Colony. The term Natal Coal Measures, though locally useful, is not quite suitable for a series which is important and contains valuable coal seams far outside the Colony. It may be desirable to say that, though adopting the Ecce correlation, I do not definitely decide on the doubtful question as to whether the Natal coal measures should be placed in the Ecce or the Beaufort series, but I consider that in either case they should be named, studied, and mapped as a separate division.

We now turn to the consideration of the distribution of coal in the Natal Coal Measures. Speaking generally, and without regard to local washouts and igneous intrusions, it may be said that, except to the west of the railway line from Harrismith to Durban, and in Durban and Victoria Counties, we find coal, in seams over a foot thick, wherever the proper horizon in the coal measures is pierced, but elsewhere the measures do not show any important seams. The diagram gives a number of typical sections of the series of seams, which I should say are selected as being the most complete readily obtainable, and not because of the thickness of the seams.

On the farm "Magnolia,"** on the high ground between Greytown and Reit Vlei, the outcrops of six thin seams are exposed, the thickest seam at the place containing 1 foot $5\frac{1}{2}$ inches of coal. It is about 4,030 feet above sea level. On the farm "Pampoen Nek," in the same neighbourhood, where the principal coal seam is thicker, a borehole** 159 feet

* Geological Survey Report, S.A.R., 1898.

** *Vide* Mines Department Report, Natal, 1898.

deep has been put down beneath the seam, proving alternating beds of sandstone and shale belonging to the coal measures, to a depth of 400 feet, where the Eccca shales were apparently reached.

To the north-west of the Greytown Coalfields, in the neighbourhood of Mooi River, Willow Grange, Estcourt, and Frere, numerous thin seams outcrop, but none have yet been proved to be of value, though much drilling has been done in search of payable seams. As examples of the boreholes, I may mention one on the farm "Greenfield,"** near Mooi River Station, about 4,550 feet above sea level and 1,095 feet deep; one on the farm "Glendoone,"** near the Bushman's River, about 3,950 feet above sea level and 1,345 feet deep; one on the farm "Welgenspruit,"*** near Estcourt, about 3,850 feet above sea level, 880 feet deep; and one near Frere*** Station above 3,450 feet above sea level, 727 feet deep.

Probably each of the boreholes mentioned, with the exception of that at Mooi River, is entirely in the coal measures. The published section of the Mooi River borehole is unreliable, owing to a misleading use being made of the term "Boulder clay." From examination of the core, it appears to me probable that the Eccca shales were reached at a depth of about 950 feet, that is, about 900 feet below a thin coal seam pierced by the bore. In the Glendoone boring two half-inch streaks of coal were observed at depths of 243 feet and 613 feet respectively. The Estcourt bore passed through 5 inches of coal at a depth of 567 feet.

Between Colenso and Pepworth Stations, the coal measures are absent, the Eccca shales being exposed owing to a great upthrow of a strip of the strata, the vertical displacement being probably not much less than 1,000 feet. The southern fault probably runs along the Tugela Valley near Colenso, turning off near Spion Kop towards Harrismith, and passing a little to the east of Acton Homes. The northern fault runs from about $\frac{3}{4}$ mile south of Pepworth Station across the farm "Burford," near the sharp southerly bend of the Klip River. Beyond that fault a strip is met with which has been dropped about 500 feet, the differential movement on the fault being therefore approximately 1,500 feet. On crossing the fault, the coal measure sandstones suddenly appear on the surface, while several boreholes, among which may be mentioned the one on the farm "Netherton," have passed through the coal seams at heights above sea level of about 3,050 feet.

Near Elandslaagte the northern side of the depressed strip is reached; and at the Elandslaagte Colliery coal outcrops, the seams being respectively 3,538 feet and 3,529 feet above sea level. From bore-

* *Vide* Mines Department Report, Natal, 1898.

** *Vide* Mines Department Report, Natal, 1902.

*** *Vide* Mines Department Report, Natal, 1890-91.

holes put down at Elandslaagte* and the Ramsay Colliery** near Wessel's Neck, it is clear the lower seam must be more than 700 feet above the Ecca shales.

To the north of the Biggarsberg, the seams are observed to be closing together. Near Glencoe Junction, on the farm "Sterkstroom," the two principal seams are 15 feet apart; at the Woodlands Colliery, between Glencoe and Hatting Spruit, 5 feet; and at the Durban Navigation Colliery, near Dannhauser, 1 foot 6 inches.

North of Dannhauser, the sections of the coal seams and the associated strata become very variable, widely different results being obtained in boreholes relatively close to one another. As a generalisation, it may be said that there we usually find two seams, one thick and the other thin. I give borehole sections from the adjoining farms "Macclesfield" and "Gardenia," and from the Newcastle Colliery. It is clear that both at Hatting Spruit and Newcastle the coal seams are far from the base of the coal measures. At the Woodlands Colliery (formerly New Campbell) a borehole has passed 500 feet below the seams without reaching the Ecca shales, while on the farm "Johnstone," between Newcastle and Utrecht, a borehole at a lower geological horizon than the coal has gone down 600 feet in coal measures, apparently reaching the Ecca shales at about that depth.

In the Utrecht and Vryheid districts the seams vary in section as they do near Newcastle, but as a rule not quite so rapidly. They are more numerous than on the Klip River field. The section showing a borehole on the farm "Hlobane" gives the sequence in that locality. The lowest seam at Hlobane is 4,030 feet above sea level, and about 400 feet above the Ecca shales, and, as the latter are thin there, little more above the Dwyka.

Little is known of the seams near Nongoma up to the present.

The coal seams so far referred to lie almost horizontally, but when we come to Somkeli, on the Zululand coast, we meet with a different condition of things, for there the strata dip at an angle of 20 to 30 degrees to the south-east. It appears probable that the parallel lines of outcrop of thick seams which are found on the Somkeli Coalfield do not represent originally separate seams, but are due to step faulting. About 8 miles inland from Somkeli we have a section showing several seams as given in the diagram, while other seams not yet correlated outcrop there. A borehole at the Zululand Colliery, near Somkeli Station, shows a very thick seam and a thinner seam lower down. In the diagram correction has been made for dip. The outcrop of the thick seam is 300 feet above sea level. If we take the shale exposed to the north of the Somkeli outcrop, and reached by boreholes below the

* B.-H. 19 B. Natal Mines Department Report, 1897.

** B.-H. 9. Natal Mines Department Report, 1889-90.

seam, to be the Ecça shales, as is probable, the lowest seam must be approximately 215 feet, measured at right angles to the dip of the strata, from the base of the coal measures.

At Ntambanana, a seam, in some places as much as 7 feet thick but seen to thin elsewhere, is opened by adits. Its relation to other seams is not clear. No other outcrops are exposed, and boreholes put down in flat country in the direction of the dip, which is slight, have shown thin seams only. Ecça shales and Dwyka outcrop inland, a few miles from Ntambanana on the Melmoth road, but it is difficult to estimate the perpendicular distance between the thick coal seam and the base of the coal measures. It is, however, considerable.

The Umlalazi Coalfield, which is on the southern side of the granite belt forming the Ungoye Range of mountains, is very different from the other coalfields in the Colony. The seams are very numerous. As the ground is much broken and tilted, and the seams variable in section, correlation is difficult. I can make no attempt to place the numerous outcrops on the northern side of what is known as the Ibade stream, but, from two borehole sections on the southern side of the Ibade, I have compiled a section showing numerous seams varying from an inch or two up to 8 feet in thickness. The lowest seam shown is probably, judging from a borehole behind the outcrop which has passed into the shales, about 900 feet from the Ecça shales.

It is unnecessary to refer to the various seams on the north coast of Natal, or to the other small coal areas elsewhere; and we may proceed to consider variations in the composition of the coals. The character of the coal in the Stormberg seam has already been referred to.

For the Ecça seams we may generalise by saying that, apart from local variations, the seams are most bituminous near Newcastle. It will be convenient to trace the changes along lines radiating from there, dealing first with the proportions between fixed carbon and volatile hydrocarbons, and then with the percentages of ash in the coals. My remarks are based almost entirely on analyses published either with the report of the Government Coal Testing Committee, 1904-5, or in the various Mines Department reports, but I have made use of a few unpublished analyses, giving some in the table, while others, not available for publication, have assisted me in checking the accuracy of my generalisations. I have avoided analyses representing coals known to be locally affected by igneous intrusions. The samples on which the analyses are based were so taken that they represent the commercial product of the seams and not specially picked coal.

Going south from Newcastle we find ratios of fixed carbon to volatile hydrocarbons as follows:—

Newcastle Colliery, 1.9 to 1; No. 42 Colliery, 2.2; Durban Navigation Colliery, 1.9; Natal Navigation Colliery, 3.4; Glencoe Colliery, 3.5; Natal Merthyr Colliery, 3.3; Central Colliery, 4.2; Elandslaagte Colliery, 2.5;—

Elandslaagte bottom seam not worked, 2·7; borehole on Swaartzkloof, 2·3; and then passing to the Greytown Coalfield: Drive on Magnolia, 11·7; Drive on Uitzicht, 8·0. Generalising, it may be said that, about Newcastle and Dannhauser, the ratio of the unaltered coal is 2; in the Hatting Spruit, Dundee and Wessel's Nek districts, 3·5; somewhat less, say 2·5, about Elandslaagte; while on the Greytown Coalfield the coal is anthracitic, the ratio being about 10 to 1.

Travelling south-eastward from Newcastle, we have ratios at Utrecht, 2·6 and 2·2; Makatese Kop, 2·8; Paulpietersburg, 4·2; Hlobane, three seams, 4·3, 3·8 and 3·6; Vaalbank, 4·6; Nongoma, 7·8; Outcrops eight miles inland from Somkeli, 9·2, 2·7 and 2·0; Zululand Colliery, 10·1, 12·8 and 11·4. It may be said that in the Utrecht district the ratio is about 2·5 to 1, and near Hlobane about 4·0.

It is harder to generalise with regard to the Zululand Coalfields, as the local disturbances and variations are greater, and comparatively little development work has been done. I have one analysis only from near Nongoma. About Somkeli nearly all the coal is anthracitic, and the ratio may be put at 10, but eight miles further inland, where the limit of the decidedly tilted strata is reached, semi-bituminous coal has been found. At Ntambanana the ratio is about 5 to 1. On the Umlalazi field the results are very variable, for though a little of the coal is very bituminous almost all is so altered as to be anthracitic.

Turning to the matter of ash, we have analyses showing percentages:—Newcastle, 11·5; No. 42, 14·6; Durban Navigation, 11·0; Natal Navigation, 10·0; Glencoe, 12·8; Natal Merthyr, 13·3; Central, 12·9; Elandslaagte, 18·5; Elandslaagte bottom seam, 15·2; Magnolia, 16·4; Uitzicht, 14·0; Utrecht, 7·6 and 7·9; Makatese Kop, 8·2; Paulpietersburg, 11·8; Hlobane, 13·1, 12·8 and 9·0; Vaalbank, 11·0; Nongoma, 2·95; eight miles from Somkeli, 22·4, 28·9 and 17·0; Zululand Colliery, 15·0, 10·1 and 16·3; Ntambanana, 19·6; Umlalazi from 18 upwards. Generalising, it may be said that, on the Klip River Coalfield from Newcastle to Wessel's Nek, the percentage of ash is about 12, but at the southern end of the coalfield, Wessel's Nek and Elandslaagte, where a few collieries work the upper seam, the percentage is somewhat higher. On the Greytown Coalfield there is about 15 per cent. of ash. In the Utrecht district the coal is exceptionally clean, the figure being about 8; while in the Vryheid district the average may be put at 12, the same as on the Klip River Field. From Nongoma we have a sample giving a lower percentage of ash than any other South African coal I am aware of. At Somkeli the average may be about 15·0. On the Ntambanana and Umlalazi Fields the coal is usually very dirty.

The percentage of sulphur present in the same seam varies irregularly within short distances, but there is some indication of variation on a larger scale. On the Klip River Coalfields the general per-

centage is above 1.5; on the Greytown Field, 3.0; Utrecht district, 1.0; Vryheid district, 0.5; and at Somkeli, 0.5.

It seems clear, when consideration is given to the way in which the carbon ratios and the percentages of ash and sulphur change as the seams are followed from district to district, that there have been general influences affecting the seams over large areas, apart from purely local influences such as igneous intrusions. Probably those general influences, at least in the Klip River, Utrecht, and Vryheid districts, were original, that is to say, attendant on the conditions of deposition. On the Zululand coast, the pressure and perhaps heat accompanying tilting and faulting of the strata observed in that portion of the Colony probably have affected the seams. Near Greytown the alteration is not improbably due to pressure also, though the seams are nearly horizontal, as the conditions appear to resemble on a large scale those observed on a small scale at the Impati Mountain near Dundee. In that isolated mountain the coal seams lie almost horizontally at a level about 300 feet higher than the same seams in the surrounding country. It seems clear from inspection of the slope between the seams and the dolerite sheet forming the top of the mountain, that the overlying dolerite is too far above to account for alteration of the coal, while a borehole put down to a depth of 156 feet below has shown no igneous rock, yet the coal is anthracitic, the ratio of fixed carbon to volatile hydrocarbons being 10.6 to 1. I attribute the alteration of the seams to the pressure which has raised the mountain and seams above the surrounding country.

GOLD.

I will now pass on to deal very briefly with the deposits of gold in the Colony. Though up to the present that metal has not been worked successfully on any large scale, it is very widely distributed, and I am sure that sooner or later profitable mines will be established.

The known deposits are most abundant in north-western Zululand, that is, approximately, in the centre of the Colony. I have had reliable information as to the occurrence of gold in practically every geological formation in Natal from the Gneiss to the Stormberg beds, but the most important known deposits are in either granite or gneiss, the Swaziland schists, the Witwatersrand series, the Black Reef series, or the Table Mountain sandstones.

GRANITE AND GNEISS.

A belt of granite and gneiss extends from near Port Shepstone through Botha's Hill on the railway, into the Eshowe district of Zululand and through the Ngoye Mountains to the sea coast. Another belt passes northward from Zululand through the Babanango Division and under the Vryheid coal measures to Luneberg, on the Transvaal Border. It is probable that the gneiss is the oldest formation in the Colony, al-

though the fact is obscured owing to the gneiss being locally altered into granite, which is in places extruded into the Swaziland schists.

Gold, in quartz reefs in the gneiss, is now receiving attention near Umzinto, and near Mpapala, in the Eshowe district. At Dumisa, near Umzinto, several thin rich quartz leads occurring in a sheared belt of hornblendic gneiss are being mined, and near Mpapala large reefs cased in granite are being opened up. In connection with the Dumisa reefs it may be noted that the quartz contains a large proportion of sulphide in depth, the sulphide being in the form of marcasite, and some at least rich in gold.

A few miles from Dumisa, a gold-bearing quartz reef known as the "Happy Thought," formerly worked by the Natal Gold Mining Coy., is interesting in view of the theory as to the connection of some gold reefs with granitic extrusions, as the reef contains felspar and mica.

Pockets of clay rich in gold have been found overlying the gneiss in several places, having no apparent possible connection with any quartz reef. At Signal Hill, near Eshowe, the gold found in the surface soil is in the form of wire gold.

SWAZILAND SCHISTS.

* The Swaziland schists do not appear in Natal proper except close to the Zululand border, but in Zululand and in the Northern Territory they are found flanking the gneiss.

Gold is very widely distributed in the schists, as, for instance, in the Tugela Valley, the Lower Insuzi Valley, and the Vungwini Valley, and near Melmoth, Nondweni and Paulpietersburg. The schists are mostly fine grained and chloritic, but sometimes, especially near the gneiss, they are coarser and hornblendic.

The variety in character of the gold-bearing reefs in schist is so great that it is impracticable to do more than refer to a few examples. Households Reef, near the junction of the Buffalo and Tugela Rivers, consists of a series of quartz bodies in a particularly distinctly laminated layer of chloritic schist. The quartz bodies are lenticular in horizontal section, but are apparently elongated in depth, resembling crooked flattened columns. No doubt the reef follows a line of shearing parallel to the foliation of the schist. The Phoenix Reef lower down the Tugela is similar in character to Households, but the casing is a coarser hornblende schist. The Enterprise Reef, at Nondweni, so far as it has been opened, consists of one large lens of dark bluish glassy quartz as much as 26 feet thick at one place. It has been driven along for a distance of 740 feet, which is probably almost the full length of the lens. It appears most probable that the reef lies along a line of shearing which has been opened by subsequent end pressure on the strata. The Sisters Reef at Nondweni is of a different type, lying, as it does, along the under side of an interbedded basic dyke. Most of the quartz veins in the

schists appear to owe their origin to the opening of the folia of the schists, by either end pressure or folding.

What is known as the Sisters' "Hill Formation" is of special interest to the geologist. It crops out as a great bed or vein in the schists, with a width at one place of as much as 120 feet, and consists mainly of silica and carbonate of iron with some chlorite. Numerous small and irregular quartz veins, many of which are rich in gold, ramify through the body, converting it into a "stockwerke."

Though the unweathered rock is extremely hard it weathers very rapidly, leaving a network of quartz veins standing.

WITWATERSRAND SERIES.

The strata which I believe belong to the Witwatersrand series are exposed, in the Buffalo Valley a short distance above its junction with the Tugela, in the upper portion of the Insuzi Valley, in the Umhlatuzi Valley near Nkandhla, in the Valley of the Pongola River near Paulpietersburg and Louwsberg, and in a few smaller areas elsewhere. The series consists, in the Colony, of alternating beds of quartzite and schist, with occasional beds of gold-bearing conglomerate. The beds are invariably much folded, with the axes of the folds running approximately east and west. The reasons, apart from authority, leading me to place the beds in the Witwatersrand series are:—

1. Their relation to the Swaziland schists which frequently underlie them, and to the Table Mountain sandstone and Dwyka conglomerate which in different places overlie them directly but unconformably.
2. Their petrological character.
3. The absence of granite intrusions.
4. The presence of dykes exactly similar to the older dykes on the Witwatersrand.
5. The presence, in the lower portion of the series, of beds containing much magnetite and similar in character to the Hospital Hill shales.
6. Their age, which is apparently greater than that of less completely metamorphosed and little-folded beds containing gold-bearing banket, which may correspond to the Black Reef series.
7. The presence of gold-bearing bankets.

On the Upper Insuzi Goldfield, which has been studied by Mr. J. S. Hedges,* of the Natal Mines Department, the beds are folded into three synclines, which may be termed respectively the Upper Insuzi or Dickson syncline, the Central Insuzi syncline, and the Ntingwe or Speed-

* Mines Department Report, Natal, 1903.

well syncline. It may be remarked in passing that, on the Insuzi Gold-field and elsewhere in Natal, there are no anticlines in the Witwatersrand series, the synclines butting against one another along lines of faulting. It is not certain what relation the beds exposed in the three synclines have to one another, but it seems probable that those in the Upper Insuzi syncline are the oldest, and those in the two other synclines of the same, somewhat more recent, age. The Hospital Hill shales do not appear, so far as I am aware, in the Insuzi Valley.

In the Umhlutuzi Valley, separated from the Insuzi by the Empandhleni ridge, the formation is similar to that on the Insuzi, but on the Nkandhla side of the Umhlutuzi River it shows remarkable side folding. Magnetic rocks similar to the Hospital Hill shales are found a short distance higher up the river.

In the Pongola Valley the folding is not so sharp as in Zululand, but still very decided. The goldfield has not been carefully studied, but it is known that there are at least two synclines, viz., one terminating about the farm Bellvue, with its axis towards Piet Retief, and the other with its northern limit about the junction of the Pongola and Pivaan Rivers.

The relation of the magnetic Hospital Hill shales, which are being exploited with a view to the establishment of an iron industry, to the quartzites and schists of the series, is very plainly shown on the farms Bellvue and Paris, while between Paulpietersburg and the western limit of the series the Swaziland schists are exposed.

Important gold-bearing banket reefs have been found in the series on the Upper Insuzi and Umhlutuzi goldfields only, the banket reefs found up to the present on the Pongola Field being poor.

In the Insuzi the most important reefs are the Dickson, the Dickson North Reef, the Central, the Delaney, and the Speedwell. The Dickson is a large pebble banket lying between schist and quartzite. It is as a rule thin, but always rich in gold content. The other reefs are all small pebble bankets, and poorer in gold content. Though the Delaney Reef is low grade, it is remarkable for the frequency with which visible gold has been found in its quartz pebbles. I do not know of such discoveries in any of the other banket reefs.

The gold-bearing quartz reefs in the series are not very important. The Wonderfontein Reef, on the Pongola, is a white quartz reef containing gold associated with lead minerals. It is an interesting example of the occurrence of gold in what is known to the prospector as "hungry" quartz. In the Upper Insuzi the "Haematite" or "Muller's" Reef lies at the junction of the quartzite and schist, the quartzite being partly replaced by the quartz. Most of the gold in the reef occurs in pockets of haematite, which are frequently of cubical form and perfect pseudomorphs after pyrites. Some of this haematite is very rich in gold.

BLACK REEF SERIES.

The Black Reef series appears at the southern end of the Nondweni Goldfields, and near Denny Dalton and Ulundi. The beds are quartzites and shales or schists, with thick banket reefs. The principal reason for considering the beds to be more recent than the Witwatersrand series is that, though they are distinctly tilted, the dip is always slight, while the Witwatersrand beds in the Colony are much folded. Unfortunately there does not appear to be any place where the relationship of the two series can be observed directly, for both at Nondweni and Denny Dalton the Black Reef series lies directly over granite. The rocks in the supposed Black Reef series do not appear to be so much metamorphosed as in the Witwatersrand series, but that might be accounted for, apart from the difference in age, by the smaller amount of folding. The series at Denny Dalton is undoubtedly older than the Table Mountain sandstones, for the Table Mountain sandstones at a higher level in the Entonjaneni hills near by are only slightly metamorphosed and lie horizontally. Dwyka conglomerate lies directly over the Black Reef series near Nondweni, Denny Dalton and Ulundi. The bankets appear to be coarse with little secondary silica. They are low grade except in portions of the reef in the Denny Dalton Mine.

TABLE MOUNTAIN SANDSTONES.

The Table Mountain sandstones are well developed in Natal on the coast side of a line running from the centre of Alfred County to Ulundi in Zululand.

In Alfred County they are white friable sandstones, closely resembling the coal measures in appearance, but distinguished from them by the presence of overlying Dwyka. Near Umzinto they become red and hard owing to the presence of a siliceous cement, becoming soft and friable again in Zululand though still in great part red in colour. Gold is widely distributed in small quantities, but the place at which most is known of its occurrence is in Victoria County near Chaka's Kraal and Stanger. The gold occurs in almost vertical quartz reefs, apparently following lines of faulty and subsidiary fracturing, and also in interstratified beds of conglomerate and sandstone. The gold-bearing sandstones and conglomerates, where unweathered, are pyritic; and the gold is apparently very irregularly distributed in them.

It is interesting to note that the gold occurs in the sandstone in two forms, viz., coarse, almost cubical and dark in colour, and fine and lighter yellow in colour, resembling the gold from "banket," but with some pieces of wire gold of similar colour. The coarse gold is found in weathered stone, and the fine in unweathered, and there seems reason to think that the coarse gold has been formed by secondary action.

In conclusion, I would redirect your attention to the following matters upon which I have touched:—

1. The geological position of the Natal coal seams.
2. The desirability of distinguishing the coal measures by a distinct name from other portions of the Ecca or Beaufort series.
3. The position of the coal seams in relation to the limits of the coal measures, and to the Dwyka conglomerate.
4. The variations in the sections of the coal seams and in the composition of the coal, and possible explanations of the variation.
5. The presence of the Witwatersrand series in Natal.
6. The presence of the Black Reef series.
7. The relation of the Table Mountain sandstones to the Witwatersrand and Black Reef series.
8. The occurrence of synclines without anticlines in the Witwatersrand series.
9. The occurrence of gold in the Table Mountain sandstones.

I cannot claim that I have dealt satisfactorily with these various matters, but my purpose will be served if I have brought to your notice some few facts not generally known; if I have given you material in the discussion of which you can bring your knowledge gained elsewhere to bear; and if I have in the slightest degree induced further geological investigation in Natal.

The growing of fodder crops for fattening sheep and rams has long been the general practice of the husbandmen of New Zealand; and to this is owing almost entirely, remarks the *Live Stock Journal*, the high standing the New Zealand frozen lamb and mutton has occupied in the London market. "Cape barley, rye, tares, oats, crimson clover, and Italian rye-grass have been the sheep-farmer's salvation."

Seventy years ago practically no rubber was used in the United States. At the present time that country is using quite one-half of the world's production, and rubber has now come to be regarded as a necessity of life. In transportation and communication its value is perhaps most felt, as, for the purposes of transportation under progressive conditions on the railway train and on the automobile, for purposes of insulation for electrical communication and lighting, etc., it is an absolute essential for which there is no substitute.

Cacti as Food for Stock.

AMERICAN INVESTIGATIONS.

ONE of the conclusions that forces itself upon anyone who studies the economics of agriculture in this country is the necessity for one day relinquishing the present system of winter and summer farms in connection with stock farming, and for the adoption of more modern methods of winter feeding. The present system is, of course, the outcome of the conditions attending the early settlement of the country: but as farming gradually grows more intensive in every way, through economic pressure, methods in vogue in other countries for the provision of winter feeding must sooner or later be adopted by farmers in Natal. The Department last year collected statistics of the acreage set aside for winter fodder; and it is intended to continue the collection of such data from year to year, in order to ascertain what progress is being made. The area set aside for the purpose last year was 7,012 acres.

The need is, of course, for the provision of artificial fodder, to obviate the annual trek. In the light of such a need, readers may be interested to learn what progress has been made in investigations—conducted chiefly in the United States—into the food value of “prickly pear” and other cacti for stock. In recent publications issued by the U.S. Department of Agriculture, the value of the cacti as forage plants has been demonstrated; and investigations have been conducted in co-operation between the Office of Farm Management Investigations of the Bureau of Plant Industry and the Agricultural Experiment Station of New Mexico for the purpose of determining, if possible, the extent of variation and the nature of the food constituents of the different species which are likely to be utilised as food for stock. Part I. of Bulletin No. 102 of the U.S. Bureau of Plant Industry, prepared by Messrs. David Griffiths and R. F. Hare, contains a summary of recent investigations in this direction.

The plants are grouped under three headings—prickly pears, cane cacti, and miscellaneous—the first group being by far the most important, though the second is largely utilised in districts where its different representatives grow. The third group consists of miscellaneous species from other cactus genera, which on the whole are but little utilised as stock feed, although some of the species have been fed in rare instances. Samples of cacti were collected for the purpose of subjecting them to analysis, in preparation for which they were first sliced open in such a way as to expose a maximum of cut surface, and

then dried by artificial heat at a temperature of not more than 70 deg. C. The spines were then singed off by a small flame of complete combustion, care being taken neither to deposit combustion particles upon nor injure the specimens.

The amount of water in the different samples analysed varied from 60.99 to 95.5 per cent. The miscellaneous group is relatively more succulent than the other two, the average amount of water being 87.88 per cent., while the prickly pears averaged 84.26 per cent., and the cane cacti 78.47 per cent. As a rule, the fruit contained more water than the stems and the younger growth more than the older. The difference in the species in the field during a dry and a wet season is very marked, and even prickly pear has its limit of drought endurance. Experience in southern Texas, it is stated, demonstrates that it is much reduced in value during very prolonged dry seasons, for it becomes tough and leathery.

The average ash in the air-dried stems and fruits of the prickly pears analysed amounted to 18.25 per cent., for the cane cacti 15.5 per cent., and for the miscellaneous group 13.54 per cent., one sample running as high in ash as 33.8 per cent. of the air-dried substance. These averages, it is remarked, would be still higher if they did not include the ash of fruits, which always contain less ash than the stems. The elements of the ash are present in about the same proportion as in the ash of other plants, except potassium, magnesium, and calcium, which are found in large amounts. It is probably the presence of these salts, it is thought, coupled with the high water content, that causes cattle to scour when fed on an exclusive roughage ration of these plants.

The opinion is prevalent in Southern Texas that the old woody stems of *Opuntia lindheimeri* fed there are much more valuable as a stock food than the younger growths. So firmly do many believe this that they practise cutting off and throwing away two or three of the terminal joints when feeding. In Mexico, on the contrary, the young growth is always fed; but there the species are commonly much larger and stouter, and the trunks are altogether too woody to be fed even if it were desirable to do so. Analysis showed, however, that the younger growth has a relatively higher water content, and therefore probably causes more scouring, which is the only evil influence overcome by a rejection of it. On the other hand, the old stems contain a much larger proportion of fibre and are really of less forage value.

To determine in what proportion cactus should be fed with other foods to produce a balanced ration, it is necessary to know the amount of digestible nutriment contained in the cactus, as well as those of the food or foods with which it is to be fed. This has been determined for most foods, but unfortunately there are as yet no such data for the cacti. By assuming, however, that this digestibility coefficient is the same as that of immature green mealie fodder, the authors find the

nutriments in *Opuntia lindheimeri* to be: Protein, 0.47 per cent.; fat, 0.26 per cent.; carbohydrates, 7.85 per cent. This being the case, it is added that cactus would have a nutritive ratio of 1 : 18, a ratio which, according to the best authorities, would prohibit its use alone for any feeding standard. The nutritive ratio for a standard ration, it is pointed out, varies from 1 : 4 to 1 : 12, depending upon the age, character, and kind of animal to be fed, as well as the object of the feeding: that is, whether it is desired to produce work, flesh, or milk. If the object of the feeding is to produce milk, a cow giving a heavy yield of milk should, according to the best authorities, be fed about 25 to 30 pounds a day of organic matter, containing from 1.8 to 2 lbs. of digestible protein, from 0.4 to 0.7 lb. of digestible fat, and 11 to 13 lbs. of digestible carbohydrates, making a nutritive ration of from about 1 : 5.5 to 1 : 7. If a cow requiring a ration of this kind should eat cactus alone, it would take 160 lbs. to furnish the fats and carbohydrates and an additional 240 lbs. to furnish sufficient protein; and since, to avoid scouring, a cow should probably not be fed to exceed 50 or 60 lbs. of cactus a day, it may be readily seen how impossible it would be for a milk cow to get even a one-sided ration from cactus alone. A ration of 40 lbs. of cactus with 10 lbs. of wheat bran and 12 lbs. of mealie stover would, it is stated, furnish the nutriments in somewhat near the proper proportion. In a ration of this kind the cow would get 21.16 lbs. of organic matter, containing 1.68 lbs. of protein, 11.82 lbs. of carbohydrates, and 0.49 lb. of fat, which is in a ratio of 1 : 7.7.

With regard to the relative value of the three groups of cacti, the authors point out that, on account of several considerations, the prickly pears are much more value than either of the other two groups. They are more numerous in the wild state, they adapt themselves to cultivation more readily, make a more rapid growth, and are more readily propagated from cuttings, all of which considerations are of vital importance in the economic use and handling of the crop.

Practically all the Mexican prickly pears are fed to stock to a greater or less extent, especially those growing where the fodder is the most scarce, but there is only one cylindrical-jointed species (*Opuntia imbricata*) which is used to any appreciable extent. The authors state that their experience has shown that *Cereus giganteus* is readily eaten by cattle when chopped up, but add that they know of no feeding having been conducted with it on any commercial scale. *Echinocactus orcuttii*, which is typical of a considerable group of species, is occasionally fed in Lower California. It is only in rare instances, however, that any great quantity of feed can be secured from cacti, outside of the genus *Opuntia*, and the greater part of the feed in this genus is stated to be produced by the flat-jointed forms. There are about five species in the cylindrical-jointed group which have been fed with some success: *O. imbricata*, *O. arborescens*, *O. spinosior*, *O. fulgida*, and *O. prolifera*. These species

constitute the best of the cylindrical-jointed group; and of these *O. fulgida* and *O. imbricata* are said to be probably the most valuable.

In the course of another bulletin, prepared by the same writers and issued from the Agricultural Experiment Station, New Mexico, some particulars are given of the use of prickly pear in Mexico. In that country the use of the prickly pear is much more varied than in the United States. All the species are fed to stock indiscriminately. Whatever is available and can be spared is singed and fed to cattle. The extent of cattle-feeding upon this kind of food is not, however, so great in Mexico as one would suppose from the abundance of the material and the great extent of time during which the practice has been in vogue. The fact is, it is stated, that the average peon cannot afford to feed to stock what he himself can use so profitably in other ways. The prickly pear is to the peon primarily an article of human food, and its place cannot be taken by any other plant. The fruit, as well as the young joints, are eaten by man in Mexico, and the dried stems and joints are used for fuel. The fuel which it makes is, of course, exceedingly poor, but it serves the purpose in that land where this commodity is exceedingly scarce. The feeding of cacti to stock is, therefore, a secondary consideration. On some of the large haciendas, especially those devoted to maguey culture, the feeding of pear to working oxen during the grassless season is a regular practice, but then only wild forms are used. Over a large part of the Republic, therefore, although a large use is made of them for forage, their principal use is as an article of human food.

TICK FEVER AND ITS PREVENTION.—In a paper on "Some Investigations into Tick Fever and means for its prevention," by the Government Bacteriologist, Queensland, the author arrived at the following conclusions:—(a) Careful dipping with properly prepared mixtures will effectually destroy the majority of ticks upon an infested animal. (b) Systematic dipping will prevent tick worry. (c) Continued dipping will not prevent cattle from being attacked by the disease, "tick fever." (d) Susceptible animals may be rendered immune by inoculating them with blood from a recovered animal. (e) The losses from the inoculation fever vary from nothing to eight per cent., according to circumstances, particularly the age of the animals. (f) By protective inoculation over 90 per cent. of cattle are saved. (g) In uninoculated cattle the losses may range to as high as 100 per cent. These remarks do not, of course, apply to "East Coast Fever."

Agricultural Education in South Africa.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE.

By E. R. SAWER, Director, Experiment Stations; Principal, School of
Agriculture, Natal.

IN the course of a paper delivered before the British Association in 1905, the Director of Agriculture in the Transvaal apologised for the choice of so hackneyed a subject as the teaching of agriculture; and to-day I would enter the same apology, and advance the plea that the reasons which then demanded consideration of the problem have lost none of their force. South Africa continues to stand in urgent need of the assistance which a sound and comprehensive system of agricultural education could give, and we cannot forego the benefits of your counsel and support in face of the obstacles which have to be surmounted. Indeed, I would go further and urge that the annual session of this Association affords to students and teachers of agriculture an invaluable opportunity for gathering up the results of our yearly experience, of contrasting methods and results, and for obtaining that strength which comes from unity. We require a broader conception of the great work in which we are engaged, and the sense of a community of purpose.

In 1905 materials for an introductory chapter to the history of this movement were alone forthcoming; the Cape Colony being the only country in South Africa which had seriously attempted to provide agricultural education through the medium of a residential college. The leaders of agricultural thought were consequently concerned with the compilation of suggestions and principles for the guidance of those upon whom the responsibility of organisation might fall. In the interim practical application has been made of this counsel, and to-day it is possible to report some progress along the lines earlier indicated. To an Agricultural College at Elsenburg, the Cape Colony has added a School of Forestry at Tokai; the accommodation provided at the School of Agriculture in Natal has been strained to meet applications for residence, and active steps are being taken for the completion of similar institutions at Potchefstroom and Frankenwald, in the Transvaal. The nucleus of teaching centres is also to be found in the experiment stations which have been established at various points in the Orange River Colony and Rhodesia, while official journals and the public press continue to afford an increasing number of channels for the communication won.

While the Governments of the various Colonies are thus pursuing

an enlightened policy as regards agriculture, economic conditions are lending a further impetus to the new movement, and compelling support from the professional and industrial classes, who, strange to say, have never hitherto warmly sympathised with the object of this education. A solution of the momentous problem of local industrial stagnation is now, however, being generally sought in the diversion of labour from the arts and crafts to agriculture, for it has been recognised that agrarian settlement is the only available means through which industrial equilibrium can again be secured. The disasters which have too often followed the introduction of penniless and untrained settlers have further convinced thinking men that no useful purpose can be served by a repetition of such experiments, and that lack of capital can only be compensated by a thorough technical training for the adopted profession. The personnel of agricultural students affords a clear index to these economic conditions and the urgent and increasing need for a thorough and inexpensive ground in the theory and practice of scientific farming: men of twenty-eight and thirty years of age, fully qualified to pursue other professions and callings, are now turning their attention to the unlimited possibilities awaiting the progressive farmer in South Africa, and abandoning earlier provinces where the horizon has been narrowly confined by economic re-action from an artificial and inflated prosperity.

On the other hand the farming community is realising the pressure of competition from without, and falling prices within; is being brought through the medium of agricultural literature and personal observation into closer touch with the results of agricultural progress in other parts of the world, and is beginning to recognise that with a denser agricultural population and enhanced land values, a system of more intensive cultivation and stock-management, and the adoption of methods employed by their competitors are essential to continued success.

The functions of the modern Department of Agriculture resolve themselves into administration, research and education, and it is the establishment of an effective relationship between the two latter which I would wish to bring under discussion to-day. Such relationship embraces the bridging of a gap which unfortunately divides the investigator from the farmer. The student and teacher has to be connected on the one hand with the world of science, and on the other with the field of practical agriculture, and until a bond of sympathy can be secured with those for whom he is working, the results of his labours are largely nullified. That the fault lies largely at our own door I am not prepared to deny, but would rather enquire how such a situation can be obviated. The work of grafting on to the primitive methods in vogue in a new continent, systems based upon the accumulated knowledge of centuries of practice in the older countries, is no light one, and the very process of adaptation entails results which are welcomed by the intensely conservative adherents of the local school as confessions of failure. Such a

sentiment can, however, be too often traced to a failure on the part of the investigator to appreciate the local peculiarities which have given rise to a fixed line of agriculture in a given section of country. The director of an experiment station cannot afford to ignore factors, but prior to the adoption of any fixed policy, should thoroughly acquaint himself with the needs of agriculture in the locality of his work, with the habits of thought of the farmers, with the difficulties with which they are contending, and with the mistakes they are making in their efforts to render their business productive and profitable, the time will then have come for the application of past experience to present circumstances, with which he will be thoroughly conversant, for the pursual of a definite policy to be strictly adhered to and pushed with energy, and for the organisation of a system of education. In some parts of South Africa much more advantage may be secured to the farmers by spending a liberal share of our resources upon the study of subjects of peculiar local interest than in dissipating the energies of the stations over so wide a field that none of the investigations can be carried to a successful conclusion. In Natal we are happy in the possession of small outlying farms devoted in the one case to investigations associated with irrigation farming, and in the others to the cultivation of such tropical crops as flourish in our coast belts, while stock management, the study of a limited number of staple crops, and constructive forestry receive attention at the Central Station. Past experience has shown that the farming community demands rather the settlement of one or two questions of paramount importance than an attempt to solve at once the innumerable problems with which we are confronted. Let none of our stations fail by undertaking too much. When organising experiments I am guided by the dictum: "The shortest way to do many things is to do only one at a time."

The organisation of an experiment station has been compared to the organisation of an army, being simply a corps of scientific workers, together with the necessary equipment, organised for a special purpose. It remains to be seen how far joint operations between the now isolated units scattered throughout South Africa may further the general object in view. Freedom of action is one of the prime essentials to all successful research, but there are numerous ways in which the large questions of agricultural science may be materially facilitated by union of effort. For the very reasons stated above, localised investigation is eminently desirable, the personal factor counts for much, and probably personal pride and ambition are the greatest stimulents to efficient work, which being the case, loss of identity in a common undertaking might entail the loss of motive force. On the other hand, there is undoubtedly continuous duplication of purely mechanical work in which no original thought is involved, as, for example, in the repeated analyses of commercial fertilisers and foods, where economy of time and labour might

be effected by the partition of such undertakings in accordance with some well defined arrangement. A careful comparison of results obtained at different centres where a similar line of enquiry of common interest was being followed would also furnish material for the establishment of a School of South African Agriculture enjoying the authority and support of a number of investigators. The subject, however, is one to which justice can hardly be done in the time at my disposal, and I shall later take the opportunity of suggesting that a committee be appointed under the auspices of this Association to take into consideration a system of co-operation between workers in the field of agricultural research. It would be presumption on my part to offer any opinion upon the methods of research to be adopted, and it is rather with the means by which effect may be given to results that I am immediately concerned. To communicate his news in intelligible form to those by whom it is to be put to practical effect, is as much the duty of the investigator as the conduct of the experiments from which it has been derived, and frequently by no means the least difficult part of his task. We have frequently to meet the question, "What are our experiment stations? What are they doing for the farmers?" And a satisfactory response can only be given in the form of acceptable advice, which shall be the direct or indirect means of increasing the productive capacity of the agricultural industry.

As a medium of communication, the Agricultural College has so many advantages that it has come to be regarded as almost an essential complement to the Experiment Station. Our students are valuable agents for bringing us into contact with the farming community at large, and their influence in the dissemination of new ideas is far reaching. The necessarily limited duration of their residence is an advantage in that it is possible to present to, and impress upon, a larger number the fundamental principles of scientific agriculture. In this connection I would urge the desirability of as many special courses, open to others than regular students, as the staff with its equipment can render effective and complete, for the personal relations established in such short technical courses go far to remove misunderstandings and to win the confidence of the farmers. Much has been written and said about the ideal training to be adopted, and the wide divergence of views observed can only be explained by the varying circumstances to which they are attributable. A progressive modification in the curriculum of our local Colleges is anticipated, for at the present time an urgent demand exists for a short and relatively complete training by many who have but a limited time and still more limited means for equipping themselves for an agricultural career. It should, however, never be forgotten that the main purpose of such a training is *education*, the "training of the mind so that the hand shall manipulate with accuracy, the eye shall see with accuracy, the mind shall think with accuracy, and all the powers of brain, eye, and hand shall work in unison to increase and enlarge the productive

capacity of the earth, to cheapen the means of subsistence, and thus to give man more leisure." That short courses call for less preparation and equipment is a fallacy which will not be entertained by any who may have had experience of what have been called popular lectures. The compulsory elimination of matter valuable in itself, but of less immediate importance to those whose interests are at stake, is a task calling for the exercise of the utmost discretion, while the power of combining thoroughness with precision is one enjoyed by a very limited number of teachers. Such emergencies and the peculiar features of South African farming lead to a demand for the best obtainable equipment for practical demonstration and manual training. Practical demonstration is the short cut to a given end in tuition, and manual training of diverse character has an enhanced value in a sparsely populated country where farms are situated at a distance from industrial centres, and means of communication are as yet primitive.

In accordance with such considerations, and while never losing sight of the higher object to be served by agricultural education, to wit, the development of intellect in students, practical training plays a large part in our own system, including, as it does, a grounding in the practice of dairy-work, engineering, carpentry, building and farriery.

It was frequently been urged that if the station staff be doing its duty, it has little or no time for anything else, and if the members of a College Faculty be as fully occupied, as they generally are, they have little or no time that can be devoted to the station work without doing injustice to the College. A partial solution to this difficulty has been secured by the co-operation of experts attached to the respective departments of agriculture, but a strengthening of the teaching staff at all centres is an undoubted desiderium. It has, however, been found possible to conduct many experiments in such a manner as to utilise the intelligent labour of students, to which course I cannot see that any reasonable objection can be raised.

To teach at first the few and then wait patiently for the seed so scattered to spread from comparatively few centres is a method which will not commend itself to those who appreciate the vital necessity of hastened progress in agricultural development, and other channels of communication must be sought, reaching those who are actually engaged in farming and consequently unable to avail themselves of collegiate instruction. At the outset the means chosen must bear definite relation to the character of the people we wish to reach. Throughout life the farmer's occupation stimulates the power of judgment and observation; they have been learning by seeing, and in few cases will extract much from letterpress or unillustrated addresses. Concrete facts are always in order, and lantern lectures, exhibitions, diagrams, and pictures are the media through which information is to be conveyed. The graphic method of illustrating results can hardly be used too frequently.

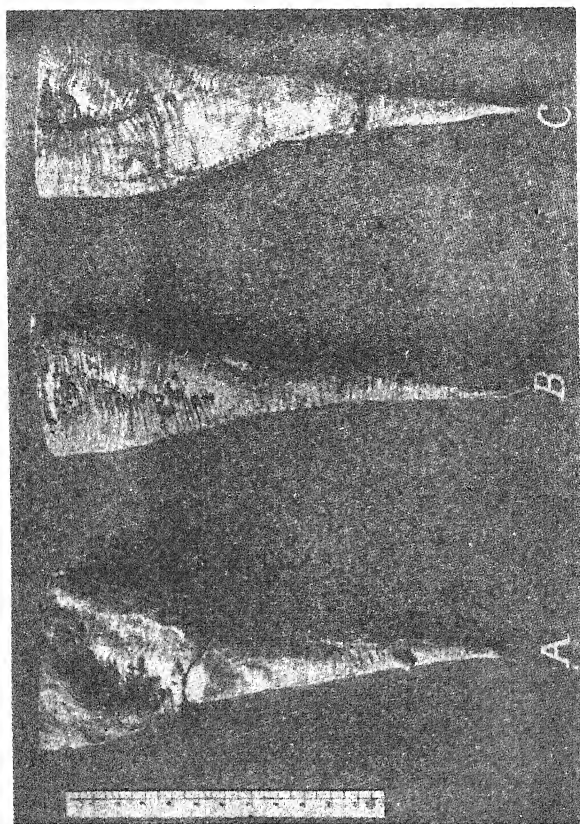
Lectures at a number of centres, agricultural shows and conferences, bring with them the advantages of personal intercourse which can hardly be over-rated, but to place facts and information at the disposal of the whole farming community with the least possible delay, recourse must be had to publication in some form or other. What to publish and how to publish, are questions deserving careful consideration. In South Africa the departmental journal has attained an importance hardly surpassed in other parts of the world, and anyone who has had the privilege of editing a periodical of this character cannot but be struck by the immense influence exerted through such a medium. One also learns that its value is largely commensurate with the number and character of the illustrations. A picture, or diagram, to every page of letterpress, though adding considerably to printing costs, is an allowance calculated to gain the desired end, which is careful attention to all contained matter. The bulletin, dealing with a single subject, or even a single aspect of a given subject, to which it is desired to call particular attention, forms an invaluable supplement to the journal. If it is to serve its purpose it must be brief, not exceeding four or six pages if possible, and including at least one striking illustration, which is better printed on the cover. This should be sent gratis to all farmers making application for same, but not broadcast, or it at once sinks to the level of a patent medicine advertisement. The more frequently we send out short bulletins the better. In addition to journal and bulletin, some annual publication is required in which to permanently record for the information and later use of all workers in the field of agricultural research the great mass of data which is collecting all the time. The contents would not be interesting to farmers, but absolutely essential to station men in determining the value of conclusions. The value of such a year-book, of which a limited issue only would be required, would be greatly enhanced if it were possible to include within its province the whole of British South Africa. From such a treatise and other sources it would be further possible to compile a "Farmer's Handbook for South Africa," containing figures and data in tabular form, to the individual sections of which it should be possible to secure the contributions of specialists.

Before closing this paper I would wish to pay a tribute to the aid which is being lent by the progressive public press in South Africa to the cause of agricultural development, and to acknowledge the value of these journals in the work in which we are so much interested. It behoves all investigators to cement a bond of common interest and good understanding, which will result in making our work far more effective than if two great educational forces worked on independent and disjointed lines. Farmers believe in the paper they patronise, and we cannot do better than choose a medium in which he has confidence. It may often be possible to reach large numbers of men through the vehicle of the daily papers, who would never read an official publication;

and I am confident that our journalists would be, and indeed are, only too happy to publish at least a digest of the current researches and discoveries in agriculture.

It has only been possible in the time at my disposal to endeavour to set in motion a train of discussion which may serve to enlighten those of us who are engaged in pioneering the cause of agricultural education in South Africa. I have purposely given small place to the individual difficulties encountered, for here each must work out his own salvation, and, when all is said and done, success will always depend rather upon the men than upon their visible resources—“*Pater ipse colendi viam haud facilem esse voluit.*” Much of the most valuable agricultural research has been accomplished in the face of what appeared to be almost unsurmountable obstacles, and I am here to-day rather with a plea for organisation for some closer bond between our only too limited and scattered numbers, whose very paucity demands concerted action. This project is therefore left in the hands of members present, whose decision, I feel confident, will be that it is not foreign to the objects of our Association.

FORCING PLANTS WITH ANAESTHETICS.—An account of some amazing results which have been obtained from drugging plants is given by Mr. Clarke Nuttall in *World's Work* for July. Dr. Johannsen, of Copenhagen, was the first to find that anaesthetics applied to plants accelerated their development. A lilac put under ether or chloroform and then subjected to suitable conditions of growth, will, it is stated, far more quickly gain its full maturity of beauty than if it had not been drugged. The moment that plants are released from the anaesthetic they begin to put forth buds, and development proceeds apace. Lilacs prefer ether, lilies of the valley chloroform. There is said to be a universal consensus of opinion that this anaesthetic process is the most advantageous for the purpose of increasing growth and for producing finer and more luxuriant flowering. The theory offered in explanation by Dr. Johannsen is that when a bud is formed in summer in preparation for the following year, it passes through three stages of rest: initial, until September (*i.e.*, in the northern hemisphere); complete, until the end of October; final, until the end of January. He argues that, when a plant is anaesthetised, these periods of rest are, as it were, condensed and thus deepened in quality while shortened in time. It is as though a certain quantity of repose were essential, and it does not matter if it be taken in a concentrated form during a short space of time, or in a more diluted form over a longer interval. But the greater the intensification of the resting state, the more rapid and easy, it is said, is the recovery.



TYPES OF SUGAR BEET.

Perfect in shape and weight and properly topped.

(From *Bulletin* issued by Colorado Experiment Station.)

The Cultivation of Sugar Beet.

By E. R. SAWER, Director, Experiment Stations.

ORIGINATING as a hostile movement on the part of the first Napoleon against Great Britain, the introduction of a beet-sugar industry into the agricultural system of a country continues to involve far-reaching political, social and economic considerations passing beyond the province of the agriculturist. A somewhat natural British prejudice from the first existed against this culture, which has been fostered by the methods of economic warfare more recently adopted by European States. The competition of bounty-fed beet-sugar seriously menaces the very existence of the cane industry, and it becomes a question as to whether the latter can survive in many parts of the world without some form of fiscal assistance. With an internal market at his door this competition presses less heavily upon the Natal planters, though there is the same urgent necessity here, as elsewhere, for the universal adoption of the scientific methods and research which were from the beginning called to the aid of the beet industry, and have done so much to ensure its position of supremacy.

The beet sugar question has a further direct bearing upon the vital problem of the white man and the coloured races, for the sugar cane, with its tropical habitat, is naturally grown by the aid of the native labourer, while the beet industry is, and has been from the outset, a white man's business. The possibility of establishing the beet as a source of sugar side by side with cane in the well-nigh unique climatic conditions of Natal eliminates all fiscal and political elements and leaves us face to face with the domestic problem of two competing crops, representing on the one hand the activity of Europeans, and on the other the product of the plantation system. The prospect of internal friction is, however, redeemed by the fact that local and South African demand alone is more than sufficient to absorb any probable output from these combined sources. Such being the case, one is able to approach a proposition which has engrossed much attention during the past few months, from the standpoint of the agriculturist, and bring under preliminary discussion the many issues involved. For the history of similar enterprises in other British Colonies reads as a warning against premature action.

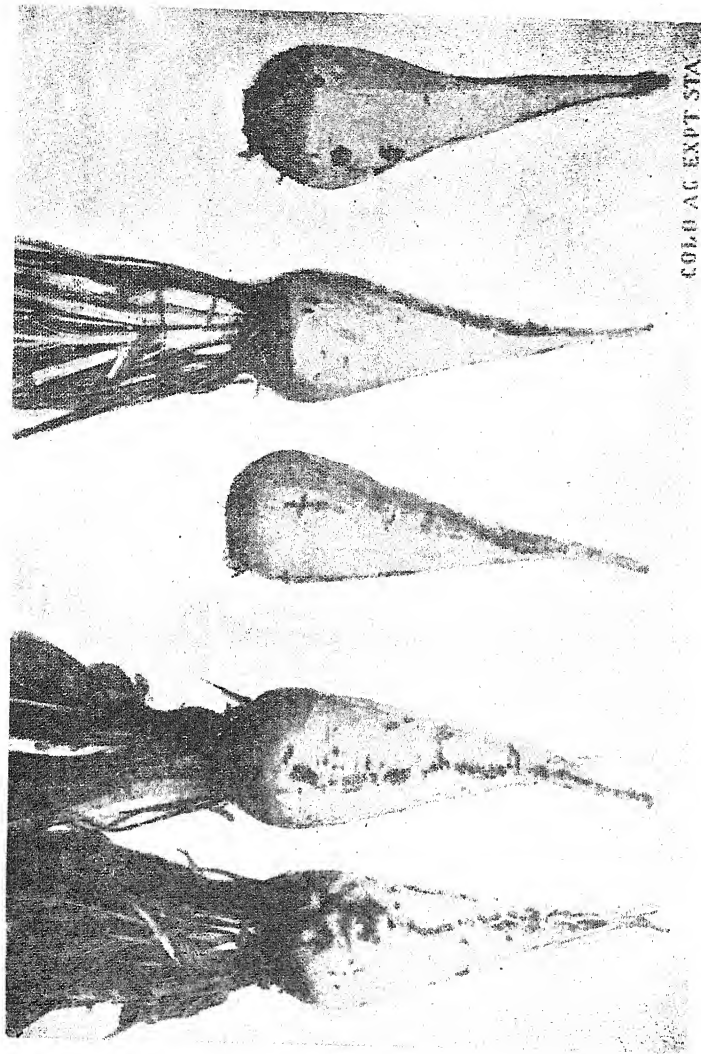
HISTORY OF BEET CULTIVATION.

Napoleon Bonaparte having closed European ports to British trade, and thereby cut off the sugar supply, undertook to supply Europe with

sugar from beet. His measures were so vigorous that by the year 1813 there were no less than 334 beet factories in France. After Napoleon's overthrow the young industry almost died out; but its merits were such as to ensure its survival. By the year 1830 it was firmly re-established, and since 1840 has, under the stimulus of bounties, grown with rapid strides, so that it now furnishes two-thirds of the world's visible sugar supply, and controls the sugar market.

In 1879 the first beet-sugar factory in the United States was erected and put in operation in California, successfully, from a financial and every other standpoint, and to-day there are about about forty factories operating in that country, with a nominal daily capacity of more than 25,000 tons of beets and a yearly capacity of more than a quarter of a million tons of sugar. On the other hand, record must be made of numerous abortive efforts which, no less than the above, afford many useful lessons of the conditions which make for success. An experiment was tried in England a few years ago, but was abandoned when it was discovered that the production could not be made within reasonable limits of expense. The trouble was declared to be in the quality of beets, which did not yield enough sugar to justify the enterprise. After further experiment it is now claimed that a method of culture has been secured which produces a beet that will yield profitably, and a further effort is being made to establish sugar factories. This experience serves to accentuate the necessity for exhaustive field trials prior to the investment of the large capital required to set the industry on a firm footing.

In 1894 and 1895 the beet sugar question was thoroughly alive in the Australian Colony of Victoria; and those interested in it were divided into two camps. One party advised that careful investigations should be made, that the farmers should be educated in the growing of beetroot for sugar by means of prizes and so on, and that the different parts of the country should be thoroughly tested in order to determine the best locality for starting the industry. The other party urged that farmers would not trouble much about the matter unless there were a visible output for their produce, and advised the putting up of a big factory at once, arguing that if the country were once committed by a heavy expenditure it would be obliged to see the matter through. The latter gained the day and a splendid factory was put up at Maffra. There was everything to ensure a reasonable measure of success had there been a full supply of roots; but the whole thing fell through for want of raw material. The factory had a capacity of 400 tons of roots a day. To keep it going at only half its capacity for 100 days would have required 20,000 tons of roots. Nowhere would it be an easy thing in any circumstances to grow straight away 20,000 tons of roots, and even more difficult with growers who are not in thorough training to the work. The first year 1,554 acres were put in, but only 1,287 were harvested, and these yielded in a very bad season 9,109 tons of roots, being at the



DESIRABLE TYPES OF SUGAR BEET.

The topped beets indicate method of topping.

(From *Bulletin* issued by Colorado Experiment Station.)

rate of 7.08 tons to the acre. The second season was even worse than the first; 1,789 acres were put in, of which only 1,509 were harvested, and these yielded 6,271 tons, or only 4.15 tons to the acre. The factory had to be shut up, and the Government, which had advanced £62,000 towards the undertaking, foreclosed.* Such an outcome was due in the first place to the unfortunate coincidence of two exceptionally bad seasons with the institution of the factory, and also to an insufficient acquaintance on the part of growers with the requirements of the crop and the best methods of cultivation. Later trials amply demonstrated that no natural difficulties stood in the way of the successful establishment of the industry, and that the absence of organisation and exhaustive preliminary experiment were main factors in this regrettable issue.

In the entire process of sugar-making every by-product can be exploited, and it is chiefly due to this fact that beet-sugar can be produced at such a reasonable rate. Highly specialised machinery is, however, necessary, and a very large output essential to profitable running. A capacity of 300 tons of beet a day is probably an economic minimum in such a plant, and the original outlay involved will be at least £50,000. It will therefore be generally accorded that no useful purpose can be served by hurrying on an expenditure which can only be justified by convincing field results secured at a number of centres. With such data to hand it should be easily possible to secure a collective undertaking from growers to plant the minimum acreage necessary to keep such a factory working at its fullest capacity.

PROPOSED FIELD EXPERIMENTS.

In view of the general interest which has been expressed in the subject, no difficulty has been anticipated in securing the co-operation of farmers in the midland and up-country districts for the necessary preliminary investigations which should extend over a period of at least three years. Supplies of seed have been secured and assistance will be afforded to applicants in the preparation of experiment plots. These will be directed to the determination of the following questions:—The effect on the yield and quality of beet of (1) different manures and fertilizers; (2) autumn and spring ploughing; (3) different depths of ploughing and subsoiling; (4) different times of seeding; (5) amount of seed; (6) varieties of seed; (7) width of rows and spaces thinned in rows; (8) surface cultivation; (9) irrigation; (10) dates of harvesting; (11) varying soils and subsoils; (12) elevation.

In addition to the returns of acreage yields to be thus secured, provision has also been made for the subsequent analysis of the roots, for the value of the crop is principally determined by the sugar content,

* *The Beet-sugar Industry in Victoria.*

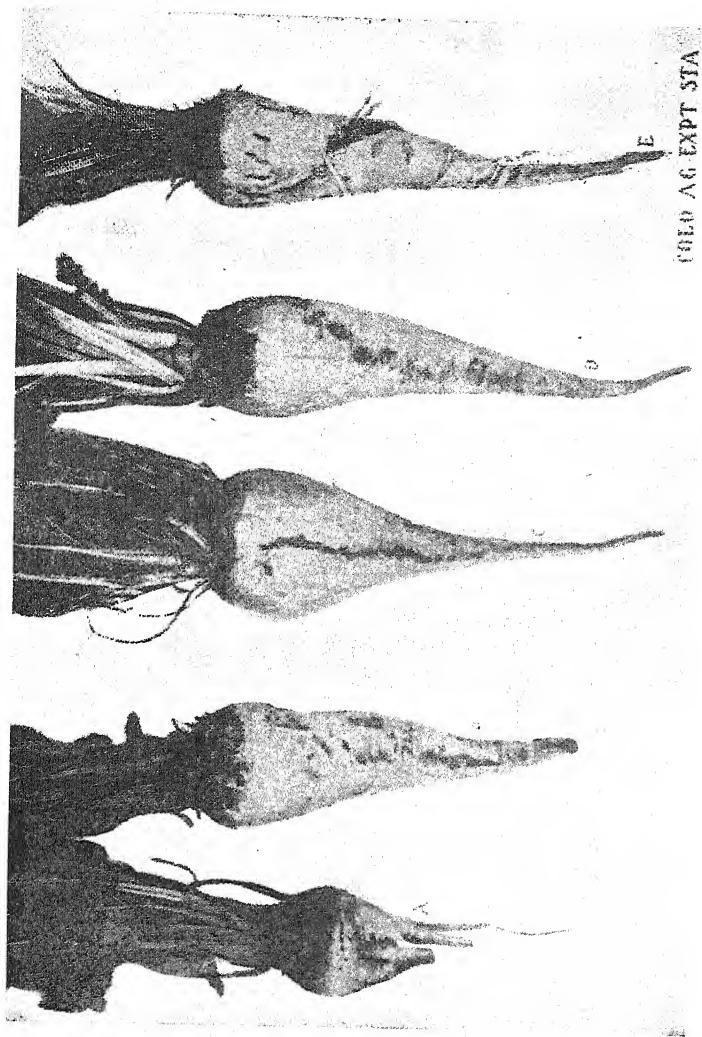
which will vary within wide limits, and its purity. In this connection the fact is worthy of note that every per cent. of saline matter present in the roots prevents $3\frac{3}{4}$ per cent. of sugar from crystallizing, and that the amount of salts taken up by the crop varies very considerably within a small area. The importance of a number of centres of investigations thus becomes apparent, and it is further obvious that no results can be regarded as final until confirmed by chemical examination.

PRINCIPLES OF CULTIVATION.

The following statements given by farmers in Colorado who had at least four years of successful experience in sugar-beet cultivation are of universal interest, and may serve as a general guide to local planters*:

1. The sugar beet crop is an expensive one to grow, and should be grown on the very best land on the farm.
2. One should not bring to the surface more than two inches of new soil in ploughing. Ground which has not been worked holds its plant food in a form not easily available to the plant. The young beet plant does not obtain proper nourishment from such soil and is checked in the beginning of its growth. When proper conditions prevail, beet ground should be ploughed at least 10 to 12 inches deep. When beet land is ploughed in the autumn, the soil is weathered, rendering plant food at surface easily available to young plants.
3. Beet ground should be as uniformly level as the lay of the land will permit.
4. Early planted beets have generally given the best yield. The seed bed should be warm, moist, but not wet, for the best germination.
5. A uniform stand is seldom obtained when seed is covered more than two inches deep. The vitality of the best seed does not seem to be sufficient to send the sprout out of the ground from greater depths.
6. Early thinning of beets has given the best results, since young plants recover from the effects of the thinning process without too serious a delay in plant growth. Do not seed more than five acres at a time, when it is possible to go over the entire field before the beets are too large for successful thinning.
7. Cultivation is for the purpose of keeping down weeds, to prevent baking of the surface and to give encouragement to continuous development of the beets.

* Bull. 109, Colorado Expt. Sta.



VARYING TYPES OF SUGAR BEETS.

- A—Burned off by stable manure unevenly distributed in row.
- B—Spiral constrictions on beet.
- C—Rapidly tapering beet—a loss in tonnage.
- D—Irrregular spiral depressions on beet.
- E—Irrregular growth of fibrous roots.

(From Bulletin issued by Colorado Experiment Station.)

8. The judicious use of water tends to produce well-shaped beets, increases the tonnage and gives a good sugar content, when proper sun and soil conditions prevail.
9. Beet farmers should plan for at least four weeks of the growing season after the last irrigation to mature the crop.
10. The growing of beets requires a crop rotation which shall maintain the humus and plant elements in the soil. A practical rotation of lucerne, potatoes, beets and grain is being gradually adopted.
11. The cultivation of sugar beets is improving farm methods in all crop production.

COST OF CULTIVATION AND VALUE OF CROP.

A comparison of statements recorded in different countries where sugar-beet has become a standard crop, serves to show that the costs of cultivation, including all charges, varies between £8 and £10 per acre, while the average yields secured range from ten to twenty-five tons per acre. The current factory price in Germany for roots showing a total sugar content of 14 per cent, and a degree of purity 88 per cent., which may for our purpose be taken as mean figures, is approximately 18s. a ton. Assuming costs to total £9 per acre, and allowance being made for the feeding value of tops and collars, it will be seen that while the lower yield leaves little or no margin of profit, a heavy crop, due to careful cultivation, may be the most profitable which the farmer can raise. And the indirect results of the thorough and deep tillage essential to such results are far-reaching. During the past 50 years Saxony has grown to be the finest agricultural province of Germany, and to serve as a model for the world, under the influence of sugar-beet production. Land which has been thoroughly worked to a depth of 14 inches, heavily manured, and carefully cleaned while under beet, can hardly fail to yield good returns to such other crops as are selected for the necessary rotation, and has in many parts of Europe almost doubled in market value.

(To be continued.)

In the United States, with the exception of one large concern in Boston, the entire rubber boot, shoe, and clothing industry of the United States is absorbed by one company, the United States Rubber Company. Rubber can be used up again; and in the United States alone nearly fifty million pounds annually consists of reclaimed material.

The Conservation of Soil Moisture.

"DRY FARMING" IN WESTERN U.S.A.

THE term "dry farming" is a recent addition to agricultural literature; and as it meets a real need, it will probably find a permanent place there. The expression is ordinarily understood to mean farming in an arid or semi-arid region without irrigation, but this is often confusing, as "arid" is at best a relative expression and irrigation is often used even in humid regions. All good farming involves at least some tillage of the soil, which accomplishes several purposes at once. The soil is aerated, weeds are killed, the tilth is improved, and moisture is conserved. Sometimes one and sometimes another of these objects is the chief aim, and sometimes all are important. In dry farming, however, the one object of paramount importance is the conservation of soil moisture, and all the tillage operations are directed to this end.

During the past four or five years much interest has been manifested in the possibility of utilising for agricultural purposes some of the arable land in the western United States, where the rainfall is insufficient for ordinary farming. Within recent years, also, investigation and experimentation have been directed toward the solution of some of the complicated problems involved in the conservation of soil moisture in these arid regions. In a bulletin issued in March by the Bureau of Plant Industry of the U.S. Department of Agriculture, Mr. C. S. Scofield, Agriculturist in Charge of Western Agricultural Extension Investigations, describes the natural conditions and discusses the farming methods and crops for one of the sections (known as the "Great Basin") and the region in question where "dry farming" is now successfully carried on with an annual rainfall of 15 inches or slightly less. Some of the more important factors that have made this development possible are shown to be a distribution of the rainfall which is favourable as to season, a clean summer fallow between crops to conserve the rainfall of two seasons where necessary to produce a crop; and the maintenance of soil fertility by good tillage, together with the continued addition of organic matter to the soil. It is shown, also, that, while something has been done in the way of using drought-resisting crops, secured either through introductions from other countries or by plant breeding, much still remains to be done in this direction, and that further work along this line, together with still more knowledge as to the efficiency and cost of various tillage methods, promises to greatly extend the boundaries of profitable agriculture in the arid West.

In the decade of 1870-1880 some pioneer attempts were made to

grow crops without irrigation in and around some of the valleys of the Great Basin. These attempts finally showed the way to the utilisation of large tracts of fertile land for which no irrigation water could be had. The first efforts were relatively few and unimportant, but as the country became more thickly settled and new irrigation enterprises became scarce and expensive, more attention was directed to the development of these non-irrigable lands.

This development was begun by sowing crops to supplement those grown on the irrigated land. Almost no attempts were made at first to establish farms on the dry lands, so that the first failures, by which the methods of success were learned, were not so disastrous as they might have been had it been necessary to build homes and make other improvements independent of any irrigation opportunities. "It is manifestly much easier," remarks Mr. Scofield, "to experiment in dry farming, to gamble on the weather as it were, if one has an irrigated farm to fall back upon in adverse seasons. Even where it is possible by the use of windmills or the development of springs or small streams to irrigate relatively small fields during a protracted drought, the settler is able to tide over times when without such a resource complete failure would be inevitable. When the utilisation of the dry lands can proceed from well-established agricultural centres, such as irrigated sections, instead of having to start unsupported in the midst of the dry lands, the risk of disastrous failure is greatly reduced."

Wheat and lucerne are practically the only crops grown without irrigation in the Great Basin; and, of the two, wheat is by far the more extensively grown. Thin seeding is found essential to the best results with these crops. Other cereals, such as oats, barley, and rye, are grown in an experimental way; while maize, sorghum, potatoes, and field peas are also being tested to a limited extent.

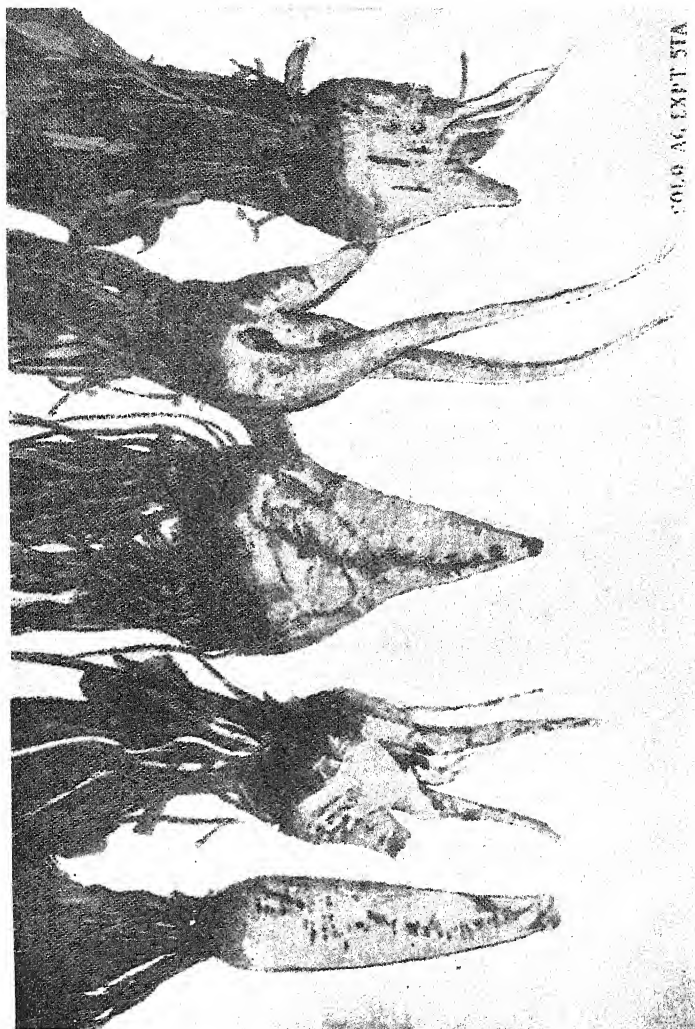
Mr. Scofield points out that one of the most important effects of the development of dry farming adjacent to an irrigation settlement is the much-needed lesson it teaches of the value of tillage. Over-irrigation with little or no tillage is the most common and serious failing of the Western farmer. It is only where irrigation is costly or cannot be had at any price and when crops actually begin to fail that cultivation is seriously resorted to. As a result, it is only in those sections where irrigation is very new or where water is very scarce that the serious effects of over-irrigation are not felt. Once the habit is found, it is much easier to irrigate than to cultivate when a crop shows signs of distress. The ground is therefore filled with water, low places are swamped or made too alkaline for crops, and the fertility of the land is seriously impaired.

With the development of dry farming, however, the beneficial effects of tillage in conserving moisture and in increasing soil fertility give a constant and striking object lesson. When it becomes apparent

that many of the same crops can be grown with adequate cultivation and without irrigation as successfully as they can be grown with irrigation alone, a farmer hesitates before undertaking to share the burden of expensive extensions to existing irrigation works. When the extension of a cultivated area is demanded, it becomes at once a practical question whether increased cultivation or increased construction shall be the basis of such extension. Whenever cultivation is resorted to in connection with irrigation, the benefits are at once apparent, but without some continued object lesson or some real need, such as scarcity of irrigation water, it is seldom seriously undertaken.

MOVEMENT OF CATTLE IN UPPER UMKOMANZI DIVISION.—With reference to Government Notice No. 338, 1907, under which the removal of cattle within the Magisterial Divisions of Ixopo and Richmond was prohibited, the Minister of Agriculture has notified that that portion of the Magisterial Division of Upper Umkomanzi bounded on the north-west by and including the farms Dripkloof and Stertrietfontein, and on the south-west by the Illovo River, has been excluded from the operation of Government Notice No. 338, 1907, this portion of the Upper Umkomanzi Division having already been included for the purposes of East Coast Fever Regulations in the Magisterial Division of Camperdown, under Government Notice No. 26, 1907.

FOOD VALUE OF SUGAR.—From various experiments which have been conducted, it is now known that a quick relief is given by sugar when an ordinary sense of fatigue is experienced. A writer in the *Louisiana Planter* points out that, although this property has seemed almost to require the title of sugar stimulation than that of sugar nutrition, any analysis of sugar shows that it is a carbohydrate food and of very definite value, and "apparently there is nothing mysterious about it." He adds that the quick assimilation and the resolution of the sugar into the blood, and the fact that it gives practically no residuary products of an injurious character, excepting the carbonic acid, which is so readily disposed of, renders it the quick-acting food that it is. The sense of fatigue that comes to tired men and tired animals is said to be owing to the presence of residuary products other than the carbonic acid, and the ease with which the carbonic acid may be expelled from the system. "If our planters would give more attention to the careful use of molasses as a food article for live stock," the writer remarks, "they would learn more and more of its merits the longer they use it."



COLORADO AG. EXPT. STA.

UNDESIRABLE TYPES OF SUGAR BEET.
(From Bulletin issued by Colorado Experiment Station.)

The Brussels Sugar Convention.

By H. J. CHOLES.

THE condition of things brought about in the sugar markets of the world by the Brussels Sugar Convention promises to be seriously disturbed by the action contemplated by Great Britain of withdrawing from the provisions of that Convention, of which she was a party, and through whose instrumentality the Convention was originally drawn up and signed. Early in June, Sir Edward Grey, the British Secretary of State for Foreign Affairs, announced that his Government considered "the limitations of the sources from which sugar may enter the United Kingdom, whether by prohibition or by imposition of the countervailing duties, as inconsistent with its declared policy and incompatible with the interests of British consumers and sugar manufacturers." This declaration was accompanied by the assurance that the British Government had "no desire to give sugar bounties or to see a revival of such bounties, or to differentiate against beet or foreign sugars." In effect, Great Britain declined to recognise, after the 1st September, 1908, the clauses of the Convention requiring it to penalise sugars declared by the Permanent Committee to be bounty-fed.

Natal cannot claim to be one of the countries of the world whose production of sugar has any more or less direct effect upon the world's markets; but this is by reason of our somewhat unique situation as regards markets. Were we isolated, a large overseas export would bring us into a much closer touch with the world's markets than we at present enjoy. Under existing circumstances, however, practically all our sugar, etc., is consumed in South Africa, the Transvaal taking (in 1906) as much as 62 per cent. of our production. The following statement, prepared from the Annual Blue Book of the South African Customs Statistical Bureau, shows the distribution of our exports:—

EXPORTS OF NATAL SUGAR, ETC., 1906.

<i>Sugar:—</i>	£
Cape Colony	93,865
Orange River Colony	55,804
Transvaal	218,937
South Rhodesia	109
Basutoland	502
Bechuanaland	1,199
Portuguese East Africa	524
	<hr/>
	£399,940

production of beet sugar in Europe on a commercial scale took place in France during the Napoleonic wars. At the time France obtained the bulk of her sugar requirements from her Colonies in the West Indies. The continental blockade and other commercial restrictions growing out of the war with England, however, suddenly put a stop to direct Colonial trade; and this interruption in the supply of Colonial sugar naturally gave a great impetus to the culture of beets, which, for some time previous, had been recognised as a possible source of sugar.

France was for some years the principal producer of beet sugar; but Germany, entering the field some little while after the middle of the nineteenth century, rapidly developed in that direction. The production of France is now surpassed, not only by Germany, but by Russia and Austria-Hungary as well.

The course of development of beet sugar production in Europe was influenced largely by direct and indirect State interference. Competition from foreign sugars was prevented in the various interested European States by fixing the rate of duty on imported sugar higher than the excise on the imported product. This excise was levied solely for revenueal purposes; and it determined the minimum price of sugar for domestic consumption, while the protective import duty fixed the maximum to which prices could be carried without incurring foreign competition.

The production of beet sugar increasing much more rapidly than the domestic consumption, it became necessary to seek for a market abroad. This was accomplished either by exempting from excise the sugar intended for exportation or by refunding, in the form of a drawback, the excise on all sugar exported. This latter method was the one first adopted. The drawback was frequently paid on a basis that, intentionally or otherwise, more than compensated for the excise originally paid, and thus carried a concealed export bounty. The indefinite amount of the hidden bounty, however, proved unsatisfactory, and the system was changed by all the more important countries except Belgium. In Russia the amount of the drawback was limited to the excise actually paid; France, Germany, Austria-Hungary, and the Netherlands abolished drawbacks and exempted from excise sugar destined for export. In place of the encouragement to exports provided by the rebate system, Germany, Austria-Hungary, and the Netherlands next granted direct bounties, while Russia and France gave privileges that were equivalent to indirect bounties. France in 1897 also granted a small direct bounty on sugar exported.

The most obvious effects of such legislation prior to the Brussels Convention were undoubtedly the artificially high prices obtaining in the countries of production and the artificially low prices prevailing in foreign markets. For example, the average price of refined sugar during the year ended 31st August, 1903, was less than 2d. per lb. in the

United Kingdom, and only 2½d. per lb. in the United States; whilst the price in the Continental sugar-producing countries varied from 3½d. per lb. in Germany to over 4d. per lb. in France. Yet at the same time that the German consumer of sugar was thus paying over 3d. per lb., German refined sugar when shipped abroad brought the exporter only 1d. per lb.

To put an end to such "unnatural" prices for sugar, and to bring about a set of conditions which would result in "natural" prices on the world's markets, is, in substance, the object of the Brussels Sugar Convention. A brief historical retrospect will enable the reader to more intelligently appreciate the principles of the present Convention.

It was in 1864 that Mr. Gladstone first proposed to take international steps for the abolition of the existing bounties on the exportation of refined sugar from the producing States of Europe; and in that year a Convention was signed with that object—a Convention that he characterised as "a beneficial arrangement, beneficial alike to importers, refiners, and consumers." For ten years this treaty continued, and during that time France managed to evade her engagements, in spite of constant protests from the British Government. The bounty obtained by the Paris refiners went on steadily increasing, and by the close of the Franco-German War had jumped to a formidable sum. The bounty at this time was confined to refined sugar, and arose from the fact that the duty was paid on the raw sugar as it entered the refinery according to an estimated yield of refined sugar, the full duty on pure sugar being returned as a rebate on that portion of the refined sugar which was exported. The method of estimating the yield was imperfect and incorrect, and also gave opportunities for fraud and deception. The result was that a much larger sum was returned in drawback than had been paid in duty.

In 1872, two years before the expiry of the Convention, the struggle began. The British refiners pointed out that the only effectual remedy would be to levy no duty until the refined sugar went into consumption. By that means the refined sugar which went for export, having paid no duty would receive no drawback, and therefore no bounty. The British Government was at last convinced that this was the only remedy, and urged its international adoption. After a struggle, lasting through three years, between the British refiners and French beetroot sugar manufacturers (who were keenly alive to the fact that the bounty was preventing them from finding an excellent customer in the British refiner) on the one hand and the Paris refiners on the other, a Conference, in 1875, was at last held at Brussels, at which Great Britain, France, Belgium, and Holland were represented. After many evasions and delays a Convention was drafted in 1877, but it contained a Penal Clause to which the British Government would not agree. The French delegates, supported by Belgium and Holland, pointed out most reasonably that they could not bind themselves to establish bounties unless they

had security, in the terms of the Convention, that they should no longer be liable to the competition from other quarters. This security was refused by Britain. In the meantime Germany and Austria were beginning to give bounties. The intention was excellent enough; for the system was intended as a direct encouragement to the growth of the richest roots and to the perfecting of the machinery and processes for the extraction of the largest possible portion of the sugar contained in them.

By this time the West Indies had awoken to the menace the existing state of things offered to their local cane sugar industry. They saw that every ton of foreign bounty-fed refined sugar imported meant a ton of their own raw sugar excluded from the British markets. They therefore joined the British refiners in fighting the European bounty system.

In 1879 a Select Committee of the House of Commons went into the question, and thoroughly sifted all the details. The whole question gradually resolved itself into this: Is a duty to countervail a bounty consistent with free trade? The Committee reported that it was, and, we are told, gave conclusive reasons for its decision. The Foreign Office, however, declared that it would be contrary to the stipulations of the most-favoured-nation Clause in Britain's Commercial Treaties, and the decision of the Committee consequently became of no effect.

Mr. Gladstone, on again being in power, took the conduct of negotiations away from the Foreign Office and handed it over to the Board of Trade. That Department was, however, at the time hostile to the abolition of bounties, and the question was allowed to remain in abeyance, whilst in the meantime the bounties went on increasing to an enormous extent.

In 1889 a Convention was signed in London; but upon a small and unreasonable opposition being offered to the Bill in the House of Commons, it was withdrawn. Ten years of inaction ensued; whilst the production of bounty-fed sugar constituted two-thirds of the world's visible supply, cane sugar rapidly disappearing from British markets and British refined sugar being displaced by an annual importation of nearly a million tons of bounty-fed foreign refined.

In 1898 another futile attempt was made at a settlement of the question. However, at the Congress of the Chambers of Commerce of the Empire, held in London in 1900, a resolution was carried by a large majority in favour of a Convention with a Penal Clause; and the Government accepted this as a mandate.

In the meantime a new form of bounty, far more dangerous and excessive than any of its predecessors, had made its appearance. In 1895 the Russian Government adopted an elaborate system whereby the manufacturers were enabled to maintain the price of sugar for home consumption, by means of a high protective import duty, at a figure far

in excess of the world's price. They consequently secured an enormous extra profit, and were able to sell for export at a figure even below cost price and yet make an abnormal profit on their total production. The effect of such a "dumping" system upon the markets of the world can be imagined. Germany and Austria followed the example. The German and Austrian "Cartels," however, though resulting in a bounty, were on somewhat different lines from the Russian system, in that they were private combinations of the beet sugar manufacturers and refiners and not a combination recognised by the State. These cartels, however, depended for their success on the action of the State in maintaining a high import duty, and the advantage derived consequently constituted a State bounty.

In March, 1902, then, at the eighth European Sugar Bounty Conference since that of Paris in 1862, an understanding was arrived at, and a Convention duly signed at Brussels.

By the first article of the Convention, the High Contracting Parties agreed, from the date of the putting in force of the Convention, to suppress the direct and indirect bounties which might benefit the production or export of sugar, and not to establish bounties of this kind during the duration of the Convention. The agreement applies to confectionery, chocolate, and all analogous products containing sugar artificially incorporated in notable proportions; and to all advantages, resulting directly or indirectly for producers, from fiscal legislation, including: (a) Direct bounties granted to exports; (b) and to production; (c) total or partial exemption from taxation as to any part of the output; (d) advantages derived from excess of yield; (e) and from the exaggeration of drawback; (f) and from any surtax in excess of the rate fixed by Article 3.

Under Article 2 sugar factories and refineries of all kinds are placed in bond, and worked under the continuous supervision of revenue officers; and finished sugars are stored in bonded warehouses.

Article 3 limits the surtax to a minimum of 2s. 5½d. per cwt. or £2 8s. 9d. per ton for refined and assimilable sugars; and of 2s. 2-8d. per cwt., or £2 4s. 8½d. per ton for other sugars. The surtax, it may be mentioned, is the difference between the rate of duty imposed on foreign sugar and the rate of duty, or tax, imposed on the home product. The provisions of this article do not apply to import duties on sugar imposed by countries that do not produce sugar, nor to the by-products of sugar manufacture or of refinery.

Article 4 provides for the imposition, by the High Contracting Parties, of a special duty on the importation into their respective territories of sugars from countries that grant bounties either on production or export. This duty may not be less than the amount of the bounties, direct or indirect, granted in the country of origin. Furthermore, each of the parties has the right to prohibit the importation of bounty-fed sugars.

By the provisions of Article 5 the High Contracting Parties agree to admit, at the lowest rate of import duty sugars of any of the contracting countries, or of any Colonies or Possessions belonging to them that do not grant bounties, and to which the obligations imposed by Article 8 do not apply.

Under Article 8 the Parties agree, for themselves, their Colonies and Possessions—an exception being made for the self-governing Colonies of Great Britain and the British East Indies—to prevent bounty-fed sugar, which has traversed territories of a Contracting State, from enjoying the advantages of the Convention in the market of destination.

The provisions of the Convention apply, by Article 11, to the over-sea Colonies and Possessions of the parties, those of the Netherlands and Great Britain excepted, save as regards the provisions of Articles 5 and 8.

The Colonial attitude towards the Brussels Convention is certainly one of strong protest against any withdrawal on the part of Great Britain, or any step that is likely to upset existing things. Petitions have already been sent to the British Government on behalf of the commercial communities in Trinidad and Barbados, earnestly deprecating any change, we learn from the *International Sugar Journal*; and now certain Indian Chambers of Commerce are joining in the protest. The Karachi Chamber has declared that the “continuation of Convention would be in the interests of the sugar trade generally and the trade with India in particular, as the countervailing duties are a distinct advantage to free working.” This Chamber resolved that the Chambers of Bengal, Bombay, Madras, Upper India and the Punjab be informed accordingly and asked to make a joint representation to His Majesty’s Ministers through the Indian Government. Already, it is stated, the uncertainty which prevails is debarring capitalists from going on with schemes. The Central Factory at Antigua was the outcome of the signing of the Brussels Convention, and an important scheme for a similar factory in St. Kitts has had to be abandoned till more auspicious times. What Queenslanders think about the matter is not known at the time of writing; but they are placed in a worse position than we are, on account of the policy of their Government in permitting the employment of white labour only; and it is highly probable that Australians will feel the effect of any change as soon as anyone.

What the precise effects of England’s proposed action will be it is not altogether easy to foresee. The immediate result, however, according to some of the Continental and other sugar journals, will be the cessation of the Convention in its present form. Whether a new one will be entered into by the remaining parties of the existing Convention, to the exclusion of England, or whether each sugar-producing country will elaborate its own means of protection for its sugar industry, cannot

yet be foretold. The disruption of the present Convention, however, will open the door to any Power who likes to return to the ante-Convention system of bounties: and such a system, when once started, will, as past history has shown, rapidly increase, tending more and more to an over-production of sugar and consequent glut of the sugar market. Following that will come the retirement of smaller countries whose sugar is produced without the aid of bounties, the competition of bounty-fed sugar making it impossible to sell at a profit. The result will be a monopoly for the country or countries that enjoy most State assistance in the form of bounties.

In some quarters it is said that Germany and other countries that gave bounties in pre-Convention days will not return to the old system of artificial stimulus to production; that those countries do not desire to see the revival of bounties any more than we do. However that may be, the fact remains that Russia and Argentine, both of which remained out of the Brussels Convention, still see fit to give bounties, having apparently not yet realised that they are suffering any disadvantages from the practice! At all events, the cessation of the Convention will remove the means that has kept the sugar market in a state of equilibrium and allowed prices to adjust themselves to a "natural" level; and the barrier that has prevented the Contracting Powers from returning to the old conditions and thereby upsetting the market and forcing down prices to a level ruinous to "natural" producers.

Another result of the denunciation of the Convention will be that the bounty-fed sugars of Russia and Argentina will be admitted into England, in competition with West Indian and other Colonial sugars, and the ruling prices of sugar in the United Kingdom will consequently be very low.

We in Natal are fortunate in having close at hand a large market for our sugar, wherein we can successfully compete with the overseas product so long as "natural" prices are ruling in the world's markets; but should the present equilibrium maintained by the Convention be disturbed in such a way as to give bounty-fed sugar the upper hand in the market, the result would inevitably be—subject, of course, to the voluntary abolition of all State and Cartel bounties—an unnatural depression of prices, which would enable beet sugar to undersell us in our own markets, resulting either in the enforcement of strong protective duties for South Africa or the eventual strangling of our local industry.

A secondary consequence so far as South Africa is concerned—though, as will be seen, an important one—will be this: that the cheapness of sugar on the London markets will mean a great boom in the British jam-manufacturing and export trade. Under already existing circumstances we are engaged in a severe enough fight against foreign jams, but the reduction of a penny per tin in imported jams would probably seriously throw back our local industry.

In addition, we should, of course, be open to competition from overseas sugar to a much greater degree than we are at present; but a remedy could well be provided in the form of a high protective import duty.

South Africa can, by combined action, fight foreign sugar, no matter to what extent the production of that sugar has been assisted by bounties. Many useful lessons are to be learned from the history of the formation of the Brussels Convention; and, if it comes to the worst, we can adopt the Convention principle of either totally excluding bounty-fed sugar or imposing an import duty equivalent to the amount of the original bounty.

Nevertheless, the cessation of the Convention will have effects, both direct and indirect, on the sugar markets of the world, the anticipation of which will warrant a close study of the situation, and a close watch of the trend of events.

This article has been hastily written to secure its insertion in the August issue of the *Journal*; and the writer therefore craves the indulgence of his readers for its many imperfections, and also if he has, as undoubtedly he has done, failed to bring out many arguments that militate against the withdrawal from the Convention and a possibly consequent reversion to the evil bounty conditions existing before the forming of the Convention.

The writer wishes to express his acknowledgments to such authorities as Mr. G. Martineau in the *Economic Journal* (March, 1904); Mr. Frank R. Rutter, Assistant Chief of the Division of Foreign Markets of the U.S. Bureau of Statistics, in his interesting bulletin on the "International Sugar Situation," issued in 1904; Mr. E. Castelot, in the *Economic Journal* of March, 1905; and to articles in various current periodicals.

BURBANK'S "PLUMCOT."—Mr. Luther Burbank, whose exploits as an experimentalist in plant breeding are universally known, has recently added a new achievement to his already long list. This is a cross between the plum and the apricot, to which the name of "plumcot" has been aptly given. In a single fruit the experimenter has combined enough of the diverse characteristics of the two fruits to enable the ordinary observer to recognise the combination and distinguish each contributor to the hybrid. One of the most striking features of the new fruit is said to be its brilliant red flesh, which is possessed of a strong sub-acid flavour rendering it a favourite for cooking, jellies and jams. When fully ripe it is stated to be an excellent dessert fruit, possessing a delightful apricot-plum flavour. The fruit is about the size of an ordinary apricot, with a deep purple velvet skin.

Ostrich Farming in Cape Colony.

THE Department of Agriculture has been favoured by the Director of Agriculture, Cape Colony, with the following precis of reports recently framed by officers of the Cape Department after consulting some of the leading ostrich farmers in that Colony:—

In the districts of Oudtshoorn, George and Mossel Bay a farm provided with lucerne will carry from 6 to 14 birds per morgen per year in an average season, the number varying with the quality of the soil and the amount of water obtainable. As ostriches only eat the leaves and top shoots of lucerne, other stock (cattle, horses, mules), which consume the stalks, are usually run with them at the rate of about two per morgen.

An ordinary Karroo farm will carry an average of one bird to 20 morgen. This system of ostrich farming is not favoured by the best breeders in the South-Western districts, as the birds are wild and untractable and the quality of feathers very indifferent compared with those produced on lucerne lands.

A pair of good breeding birds will hatch out three lots of chickens in a year and will produce on an average 10 to 12 chicks at each sitting, but these are by no means common. An ordinary pair of breeding ostriches will not produce chicks more than twice a year, and, as many eggs and young chicks are destroyed by carelessness and accidents, the number of young birds reared to three months old from an average pair of breeders is not more than 18 to 20 per year. The usual price of chicks is from £1 10s. to £2, according to quality, but for chicks from first-class birds to £10 each or more is easily obtained.

The average production of the value of feathers per year is difficult to estimate as the feathers of different birds vary in value from 7s. 6d. in moderate chickens to £10 or higher in first-class cock birds, but the average annual value of the feathers per bird in the district of Oudtshoorn may be placed at £4, and at £3 in the rest of this area where ostrich farming is carried on. The quantities and prices of feathers are variable from climatic conditions and the fluctuation of the market, but the statements given above represent the condition of affairs at the present time as fairly as possible.

In the district of Beaufort West there are no farms of which the Government is aware provided at present with sufficient lucerne to run birds on.

So far as can be gauged by reckoning as accurately as possible the morgenage of several of the best camps, it is considered that about seven morgen to the bird is about the average on good veld, but information

tends to show that, generally speaking, this is too little to allow, and perhaps ten morgen would be more like the average.

Very few (if any) tame birds are at present being bred in this district, all farmers catching the wild chicks on the veld. The average number of eggs in a wild nest is about twenty, though twenty-seven have been seen, but it has been stated that the birds invariably throw any eggs more than eighteen or twenty out of the nest before they commence to sit. A tame or regularly plucked bird would probably not cover more than twelve eggs.

Birds in this as in other districts are plucked every nine months; the average pluck from a veld-fed bird yielding from £2 to £2 10s., which would work out at about £2 10s. to £3 2s. per annum. At one time there was a very considerable business done in catching wild chicks and selling them to Oudtshoorn farmers, and to a less extent this is still carried on; chicks about six weeks old generally fetch £1 per chick. Some time ago Mr. Fourie stated that he was confident that birds caught on the veld and run on lucerne lands would yield, after the first pluck, not less than £5 per pluck.

In the districts of Somerset East, Cradock and Middelburg, lucerne, provided it is grown on good soil and under irrigation the whole year, can carry 10 birds per morgen producing feathers worth £7 10s. per bird. If the lucerne is under flood water only then it will carry six birds per morgen, but other veld must also be available with feather production of £6 per bird.

On ordinary Karroo farms 100 morgen can carry 7 to 10 birds returning feathers at £3 per head.

From each pair of breeding birds 20 to 30 chicks may be reared valued at 30s. to £2 per head when a year old. It should be added that the ostriches must be good average birds to give the above results.

Mr. Leonard Acutt has left Natal on a visit to Mauritius for the purpose of studying the fibre and sugar-cane industries of that island. The expenses of his trip are being paid by joint Government and private contributions.

Considerable interest attaches to a wonderful "strike" of water in the Cape Colony, at Murraysburg, says the *Bloemfontein Post*. The Town Council of that place had an 8-inch bore hole put down which tapped at a depth of 75 feet, a supply which could be pumped out at the rate of a quarter of a million gallons per 24 hours.

Notice to Manure Merchants.

ALL manure manufacturers, agents and vendors are respectfully requested to submit their manures of the present season for sampling, analysis and valuation by the Agricultural Department in order that they may be included in the 1907 Manure Bulletin now in course of preparation.

Samples will be dealt with as far as possible in the order in which they are advised, and will afterwards appear in the *Agricultural Journal* as their analysis is completed.

Notice of the arrival or availability of manures for this purpose should be addressed to the Analyst, Central Experiment Farm, Cedara, as soon as possible.

Vlei Soils.

(Continued.)

By ALEX. PARDY, F.C.S., Analyst.

BEFORE considering the mechanical nature of these soils, it may be as well to describe their general appearance and origin.

The first foot of No. 1 was of a dark brown or chocolate colour. It was of a free coarse nature containing about one-fourth of its weight of rounded nodules of ironstone. The third foot was of a red colour, due to the presence of decomposed ironstone: it contained about half its weight of ironstone nodules. The second foot was intermediate between these two.

The first foot of No. 2 consisted of a dark brown free soil. The third foot extended into the purple (Beaufort?) shale formation; whilst the second foot contained portions resembling both the soil and the shale.

In No. 3 the first foot was represented by a rather harsh, grey-

looking soil, which at three feet deep was underlayed by a yellow clay, the second foot showing characteristics of both.

No. 4 consisted of the surface foot of a washed down soil of a dark brown colour and gravelly nature.

In No. 7 the first foot was a dark brown sandy clay overlying a stiff subsoil.

All the above samples were obtained from the low-lying lands forming part of the Experimental Farm at Cedara.

In No. 6 the surface portion was a free soil of a dark brown colour lying on a red, somewhat stiff-looking clay subsoil.

In No. 7 the first foot was a dark brown sandy clay overlying a stiff red soil.

These latter samples were obtained from the Irrigation Settlement at Weenen.

Air-dried samples were used in each case for the carrying out of the following experiments, which were undertaken for the purpose of ascertaining some information regarding the mechanical and physical properties of these soils. Under the ordinary conditions of drying and ignition they were found to contain:

			1st Foot.	2nd Foot.	3rd Foot.	
No. 1	Moisture ... Organic matter (loss on ignition)	6.94 11.23	7.56 9.22	7.23 7.27
No. 2	Moisture ... Organic matter ...	8.30 13.46	7.90 10.40	4.72 8.17
No. 3	Moisture ... Organic matter ...	6.62 13.52	5.40 9.91	4.91 7.66
No. 4	Moisture ... Organic matter ...	6.22 15.71	......	......
No. 5	Moisture ... Organic matter ...	5.39 10.97	9.37 11.96	......
No. 6	Moisture ... Organic matter...	2.06 2.88	5.07 3.92	.....
No. 7	Moisture ... Organic matter ...	1.99 2.38	5.48 5.76	......

These figures show that there are very great differences between the groups and individual soils in respect to their contents of organic matter and capabilities to hold water under the drying effects of the atmosphere when all sources of moisture are cut off. It is doubtful if much or any of the water thus so firmly held would be available to plants, but as there is a very material effect produced in soils by their organic matter; in the direction of absorbing and attracting moisture from the atmosphere and ground water, it is indicative of their relative capabilities under natural conditions to hold a supply which will be available to plants. To obtain further information in this direction it is necessary to consult the mechanical nature as well as the physical properties of the soil.

A direct experiment was undertaken in order to ascertain the relative powers of the various soils to hold water under saturated conditions, or the utmost capacity they were capable of exerting towards the retention of water. Water was added, in this experiment, to a known quantity of soil until it had absorbed as much as it was capable of holding and the excess began to drain away. It was found in this respect that these soils had various capacities, as will be seen by the following table, in which are given the parts by weight of water retained:—

CAPACITY TO HOLD WATER.

No.	(1)	(2)	(3)
I.	42	46	27
II.	44	40	34
III.	45	40	63
IV.	45	..	..
V.	61	50	..
VI.	40	57	..
VII.	46	50	..

It will be seen from these results that this property is not proportionate to the amount of organic matter present, although it is apparently much modified thereby; and, although dependent thereon to some extent, it appears to be more directly influenced by the mechanical condition, as will be seen from the table given hereafter. In the third foot of No. 3, for instance, where 63 is the measure of its capacity, the finer particles predominate. It is only moderately supplied with organic matter, but on the other hand the silt and clay portions are relatively higher, they, when taken collectively, representing over half the weight of the soil. In the third foot of No. 1, where 27 is given as a measure of its saturated condition, the coarser particles predominate, while the organic matter is in similar proportion. Further comparisons may be made from the following table in which the soil is divided proportionately into groups of various sized particles:—

MECHANICAL DIVISION AND CAPILLARY ATTRACTION FOR WATER.

Sample.	Stones.	FINE SOIL.							CAPILLARY ATTRACTION FOR WATER.			
		Gravel.	Coarse Sand.	Fine Sand.	Silt.	Fine Silt.	Clay.	Humus.	12 hours.	24 hours.	36 hours.	
I. ... { 1st foot 2nd " } ... { 3rd " }	22.75 32.21 59.05	8.38 11.48 19.30	6.76 4.48 4.46	28.36 27.71 32.24	22.22 21.35 16.36	6.61 10.59 7.64	6.12 5.37 4.34	2.68 2.96 1.71	12 12 4.5	13.8 13.7 5	16.9 16.4 6.1	
II. ... { 1st " } ... { 2nd " } ... { 3rd " }	10.32 29.08 43.87	3.70 6.88 17.42	1.59 2.26 11.63	23.17 19.16 20.87	30.41 21.58 17.00	8.66 20.47 11.78	8.25 12.25 5.85	5.30 5.00 1.16	6 10.9 5.1	7.2 11.2 5.9	9.7 13.4 6.9	
III. ... { 1st " } ... { 2nd " } ... { 3rd " }	0.11 0 0	0.21 0.25 0.30	2.13 2.70 1.45	28.34 31.24 28.82	23.09 24.43 17.90	9.76 14.09 22.39	13.32 11.21 13.99	6.51 3.14 3.71	8 5.4 4	9 6.4 5.5	10.9 8.0 6.75	
IV. ... 1st "	9.96	0.58	0.94	29.82	26.00	11.39	7.75	5.75	7.5	8.4	9.2	
V. ... { 1st " } ... { 2nd " }	0 0	0.18 0.17	2.02 1.41	28.78 19.20	19.02 15.25	19.93 14.87	11.74 26.17	4.77 7.78	2.2 4	3.2 5.2	3.5 5.5	
VI. ... { 1st " } ... { 2nd " }	1.33 0.89	1.33 0.89	45.03 34.38	27.33 19.17	5.75 12.21	9.00 15.37	3.75 4.93	1.42 1.31	9.5 2.5	10.8 4.7	11.5 6.0	
VII. ... { 1st " } ... { 2nd " }	2.41 1.06	2.41 1.06	50.41 34.49	18.40 17.81	4.18 13.17	7.39 13.03	8.47 5.71	1.93 1.21	5.5 4.5	6 5.0	6.5 6.7	

The size and distribution of the particles have much to do with fertility, both in respect to their influence on the soil's atmosphere and moisture conditions and the availability of its plant food material. Generally speaking, a soil which contains an abundant supply of the finer portions is likely to be a more productive soil than one in which the coarser particles predominate.

Under capillary attraction for water are given the heights to which water rose through the soils within given periods of time. This is a very important feature with regard to soils, particularly so in dry weather when the only source of moisture is that which lies deep down in the underlying layers. By capillary attraction such water is capable of rising in varying degrees of quantity and speed to the dry surface layers in which the plant roots may be situated. This rise of water is governed mainly by the size and distribution of the soil particles. A coarse sandy soil or a compact clay may each have a deterrent effect on the upward passage of water through the soil, the one because of the size of the grain and the other on account of its compactness. The Campbell system of dry land culture provides for this latter contingency by first breaking up the underlying soil so as to make it more permeable and then compacting it sufficiently to induce a greater capillary rise of water.

THE FARMER AND PROFITS.—In the course of his speech at the opening of the second National Poultry Conference held in England in July, Sir Thomas Elliot, of the Board of Agriculture, said he was convinced in regard to the poultry industry, as in regard to the whole agricultural industry, that there were three important things to be kept in mind. First of all, they were bound, if they wanted to succeed, to improve the quality of their produce. People might just as well, for themselves, produce articles of good quality rather than of bad quality. The difference in price was enormous, while the actual difference in the cost of production was comparatively small. Therefore, anything that could be done by the Conference, or at any other times, to induce British agriculturists to improve the quality of their produce, would be of great benefit to the industry. Then they should do all they could to prevent the preventable losses which occurred in the industry. Anything which tended to minimise the amount of disease or which tended to give the producer the full value and benefit of his produce, was also so much to the good. And then they must induce the farmer not to despise the small supplementary profits which may make all the difference between profit and loss, when the year's accounts are made up.

Oat and Barley Smut.

FROM 1898 to 1903 extensive tests were made by the Agricultural Experiment Station, Wisconsin, to determine the loss experienced by Wisconsin farmers from oat smut and the most effective remedy to be used for its eradication. From the tests made it was found that no less than 20 per cent. of the oats grown in the State were lost through smut, representing a money value of about \$900,000 annually. As a result of these experiments, it is claimed that "the remedy is so simple, cheap, and effective that there is no excuse for the Wisconsin farmers allowing the oat smut to take possession of their fields. All seed oats for next year's sowing, unless known positively to be smut-free, should be treated for ten minutes in a formaldehyde solution." It is stated that this oat smut remedy was so generally adopted that, in 1904, the oats throughout the State, with few exceptions, were smut-free, or nearly so. Experiments were also conducted in connection with barley smut. Two varieties of smut were found to affect barley, known respectively as "closed" and "loose" smut. The closed smut is eradicated by the formaldehyde method of seed treatment, but the loose smut is not. An experiment was accordingly started at the Station in the spring of 1906 with the hope of finding some treatment that would be effective for both varieties of barley smut. The treatment which proved successful was that familiarly known as the "Jensen" Hot Water treatment (discovered by Professor C. F. Jensen, of Denmark, in 1888, and further tested and modified by W. F. Swingle, U.S. Department of Agriculture, in 1898). The treatment used at the Wisconsin Station was a modification of the Swingle method. The barley was placed in gunny sacks and submerged for twelve hours in cold water for the purpose of softening the hull and berry; it was then pulled from the cask and left one hour to drain. The sacks of barley were then submerged in a cask containing hot water, held at a constant temperature of 130 deg. F. for varying lengths of time: a ten minutes' submergence was found to be of sufficient duration without danger of destruction of seed. By having boiling water in a kettle or tank near at hand, some can be added to that in the cask in which the barley is submerged, as the temperature will be somewhat lowered after the sack of grain is put in. The sack of barley should be first put into a barrel of water having a temperature slightly lower than 130 deg. F., in order to warm before being submerged in the water which is kept constantly at 130 deg. F. Seed barley, it is advised, should be sown on the same, or not later than the day following treatment; otherwise it will sprout, and difficulty will accordingly be experienced in getting it to run through the seeder or drill.

Wood and Bark.

By F. C. FERNANDO, Forester.

(Continued from page 349.)

3. The Secondary Tissues.—With the differentiation of the primary tissues, growth in length, or elongation, ceases permanently at that point of the stem or shoot. Any subsequent increase in size is caused by growth in girth or lateral development.

In the tree ferns, cycads (*e.g.*, the kaffir bread—*Eucephalartos*), and nearly all monocotyledons, such as the grasses and palms, the stem attains its final development, with the more or less lignification of the primary tissues. Such stems therefore maintain through life the girth dimensions attained at the maturity of the primary tissues.

We should bear in mind that the rigid immobility essential to the stability of a building is not required in a plant. In the classes of plants just quoted, the crown carried by the stems are as a rule branchless, comparatively light, or confined to a whorl of leaves situated at the summit of the stem. It is reasonable therefore to infer that the mechanical equipment of the stem furnished by the primary tissues is adequate to meet all requirements for the stability of the plant body.

On the other hand, in the conifers, and such dicotyledons or broad-leaved species as attain to shrub or tree size, we have a different set of conditions. The crown in every such case is comparatively heavy, and composed of an ascending series of leafy branches distributed tier above tier, and clothing a large proportion of the stem. The weight of such an elaborate superstructure, combined with the additional bending strain exerted on the stem by the resistance afforded by such a mass to wind, must make a greater demand upon the strength of the stem than in the previous case; and it therefore becomes necessary that the primary tissues be augmented by additional tissues to enable the stem to successfully withstand the additional strain put upon it. Such tissues laid on subsequently, increasing the strength, and elaborating the structure of the stem, are termed the Secondary Tissues.

Secondary tissues take the form of complete superimposed zones of tissue deposited between the wood and bast strands of the primary tissues. While on one hand every successive zone or instalment of secondary tissues corresponds with the further elongation of the terminal and lateral shoots of the tree, and therefore with an advance in its age, its effect on the other hand is to increase the girth of the stem. The stems of such trees therefore continue to increase in girth from year to

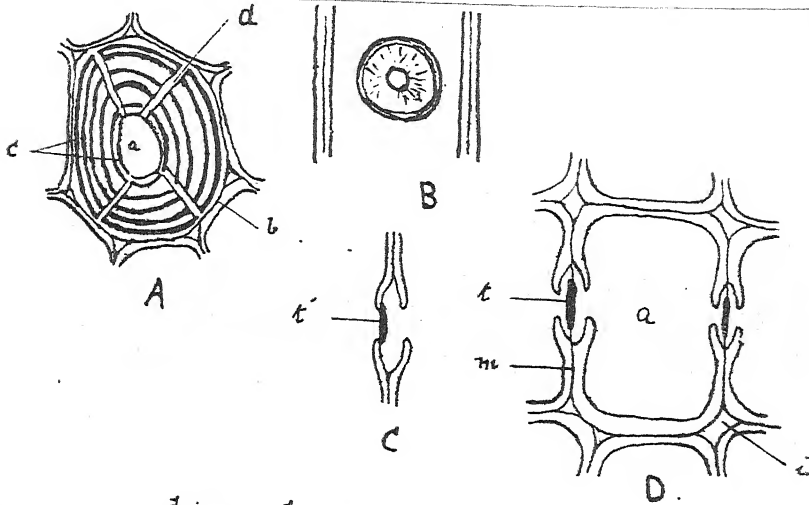


Fig: 1

FIGURE 1.—A.—Transverse section of a lignified cell. *a*—Cell cavity; *b*—Primary wall; *c*—Thickening layers of secondary deposit; *d*—Simple pit canal.
 B.—Bordered pit in surface view.
 C.—Same in tangential view. *t'*—Loins closing pit-cavity.
 D.—Transverse section of a tracheid. *a*—Lumen; *m*—Primary cell wall; *t*—Loins; *i*—Intercellular space.

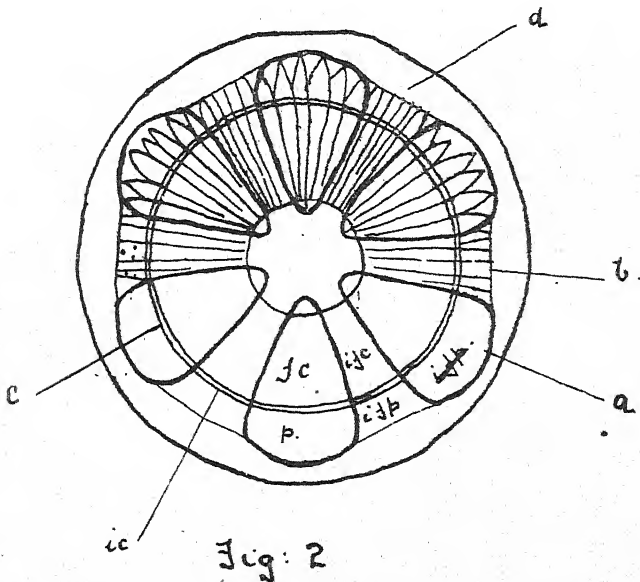


Fig: 2

FIGURE 2.—Diagrammatic representation of transverse view of an exogenous stem at the commencement of the formation of secondary tissues. *c*—Fascicular cambium; *ic*—Interfascicular cambium; *a*—Primary fibro-vascular bundle strand; *b*—Secondary fibro-vascular bundle strand; *fc*—Wood formed by the fascicular cambium; *ifc*—Wood formed by the interfascicular cambium; *p*—Bast formed by fascicular cambium; *ifp*—Bast formed by interfascicular cambium; *d*—Tissues external to first-formed bast, consisting of the pericycle, primary cortex, and epidermis. The upper shaded part of the figure shows medullary rays.

year. In them the differentiation, and maturing of the primary tissues, marks only a primary stage in the development of what is popularly known as wood and bark.

(a) The Cambium.—In the previous instalment of this article, appearing in the April number of this *Journal*, it was said that in an exogenous shoot, upon the differentiation of the primary tissues, the vascular strands were arranged in a ring immediately within the periphery of the Central Cylinder. Each strand consisted of an outer or Bast and an inner Xylem, or wood portion, divided by a band of primary meristem termed the Fascicular Cambium. The several strands were separated from each other by radial rays of ground tissue, the primary medullary rays (see Fig. 6, page 347).

The first step in the formation of secondary tissues consists in portions of the primary medullary rays, lying between the detached portions of the fascicular cambium, becoming active as a secondary meristem, and termed collectively the inter-fascicular cambium, because it occupies positions between the fascicular cambium. The effect is thus to produce a complete ring of cambium or active, formative or generative meristematic tissue, situated in the midst of masses of permanent tissue (Fig. 2). Although in a transverse section of the stem, the cambium appears as a ring; it occupies—in a similar position—all portions of the stem, roots and branches wherever secondary tissues are being formed, as a thin sheet of actively growing and multiplying delicate cells. The cambium functions as a centre of activity from which the masses of tissue contributing to the growth in thickness of the stem originate. Apart from the inherent peculiarities of any one species, the state of its health, and the nourishment available, must therefore determine the quality and quantity of the material it produces.

Cambium cells take the shape of rectangular prisms, with the ends sharpened or bevelled like the cutting edge of a chisel. In other words, they are brick-shaped, with bevelled ends. Each cell is so placed that the broader side occupies a position at right angles to the medullary rays, the bevelling of the ends being along lines parallel to the direction of the rays.

(b) Growth in thickness in an exogenous stem.—With the completion of the cambium ring secondary vascular strands, containing both xylem and bast, are intercepted between the original ones (Fig. 2, *ifp*). The effect is to produce a close ring of fibro-vascular bundles or strands, separated from each other by medullary rays (Fig. 2). With the continued activity of the cambium ring fresh material is added to both xylem or wood, and bast or living bark, of all the vascular strands, as well as to the medullary rays. The vascular strands now lose their original pear-shaped outline, and become wedge-shaped, with their broader ends directed outwards. The appearance presented by the transverse section of the stem may now be compared to a wheel. The

hub would represent the central pith. The spokes the radial bands of medullary rays, and the spaces between them the vascular strands, both wood and bast, together with the cambium ring; while the fellars and tyre would represent the now functionless epidermis, primary cortex and pericycle, destined to be cast off as the first shed bark. See also Figure 2.

As the vascular strands broaden with the increasing girth of the stem, secondary medullary rays arise, subdividing the original strand. Such secondary rays, since they arise subsequently, are found to end blindly in the wood at one end, and in the bast at the other; and may by this means be distinguished from the primary rays. (See radial and transverse views of rays in Fig. 3.)

The activity of the cambium continues throughout the life of the tree. Its cells grow and multiply, contributing material for the formation of fresh wood and bast, and adding to the tissues of the medullary rays. The new material thus formed is deposited in concentric, superimposed layers, the new wood being placed outside the older wood; and the new bast inside the older bast. Such is the principle of secondary growth in the stem of an Exogen. The transverse section of the stem (Fig. 3), while it now presents an appearance more in keeping with wood as we meet with it in the form of timber, might seem irreconcilable with the appearance presented by a similar section of the same shoot at a much earlier stage. A careful comparison of Fig. 6, page 347, of the April number of the *Journal*, with Figs. 2 and 3, accompanying the present instalment, is recommended to elucidate the difficulty, should such exist.

In studying the structure of wood, or in the comparative study of different species of wood, all requirements are best met by using specimens of the shape represented in Fig. 3. Such a specimen represents sections of the stem in three different directions at right angles to one another. Thus in the figures—both A and B—the direction “q” represents a transverse section of the stem cut at right angles to its axis; “l” a radial section, cut parallel, and “t” a tangential section cut at right angles to a medullary ray. In this figure, A represents the stem of a conifer, and B that of a tree of the broad-leaved class.

We are already familiar with the general structure and appearance of the stem of an Exogen exhibiting secondary growth, and of the manner in which secondary tissues are developed. The histology, or minute structure, of the cambium has also been described. We will now proceed to describe the histology of the remaining masses of tissue which build up the stem. There remain the vascular strands, and the medullary rays. To facilitate description we shall speak of the xylem, or wood portions of the vascular strands, as the wood strands; and of the bast portions of the bast strands.

(c) Elements of secondary growth in the wood strands of conifers

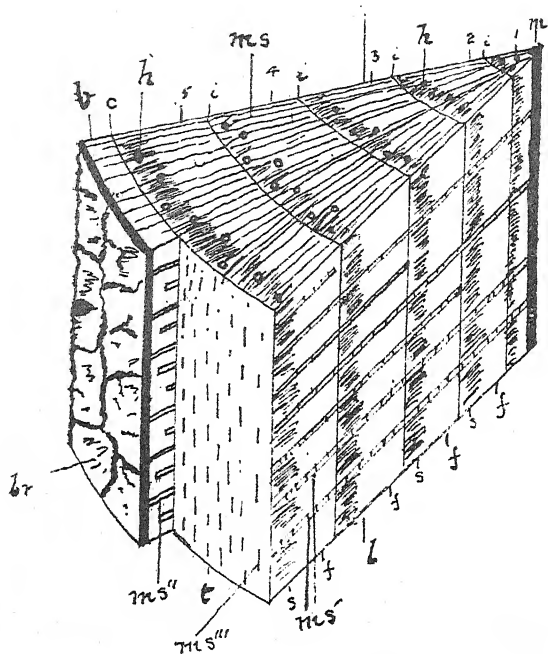
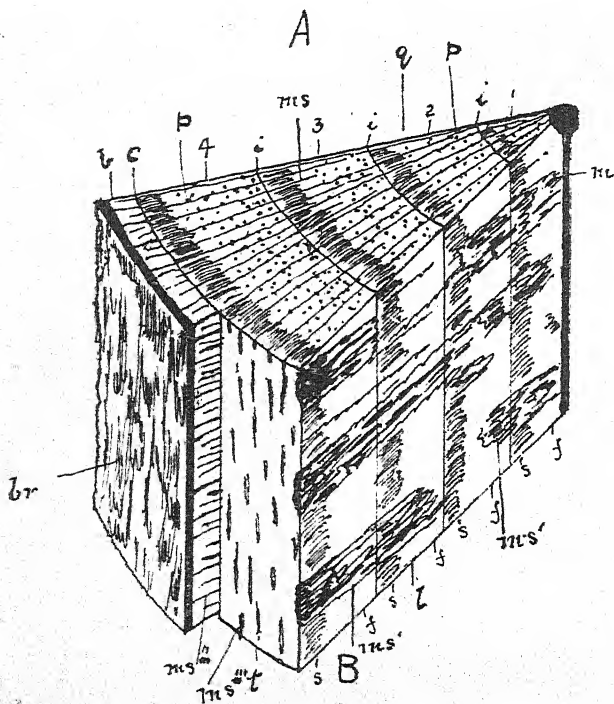


FIGURE 3.

A.—Portion of a stem of the Pine (representing the conifers); and

B.—Of a broad-leaved species. A.—Five years old. B.—Four years old. Both cut in winter :—

q—Transverse view ; *l*—Radial view ; *t*—Tangential view ; *f*—Early wood ; *s*—Late wood ; *m*—medulla ; *1 to 5*—The successive annual rings of the wood ; *i*—Junction of the wood of successive years ; *ms, ms'*, *ms''*—Medullary rays in transverse, radial, and tangential view ; *ms''*—Radial view of medullary rays in the bark ; *c*—Cambium ring ; *b*—Bost ; *h*—Resin ducts ; *p*—Vessel pores in transverse view ; *br*—Bark external to the peridium layer.



and broad-leaved species.—The cell-wall of a growing cambium cell—like the cell-wall of every such vegetable cell—is very thin, transparent, highly elastic, and permeable to fluids; and consists largely of a material termed cellulose. When, however, such a cell attains its full size, becomes an adult and enters into the composition of wood or bast, its cell-wall undergoes a change in structure. It becomes thickened by the superposition of a series of coats or lamellae deposited on the inside of the primary cellulose wall (Fig. 1, A). The material of the thickening layers consists largely of a hard, inelastic substance, more or less impermeable to fluids, termed lignin. Hence we speak of such cells as becoming woody, or lignified. As the cell-wall thickens the cell cavity, or lumen, diminishes, and becomes nearly or quite, obliterated.

The thickening of the cell-wall does not take place uniformly over the whole surface. Some portions are thickened, while at other points the original or primary cell-wall remains unaltered. As the holes thus produced in the contiguous lamellae correspond with one another, pores are gradually formed penetrating the thickening layers and leading towards the centre of the cell cavity (Fig 1 A, d). These pores or pits present either a circular or an oblique outline. Such cells when seen under the microscope transmit the light differently through their pore canals and their thickened walls, and hence they present a pitted or dotted appearance, as though pierced by a number of holes. Such cells are known as “pitted cells,” and the pore canals as “simple pits” (Fig. 1 A, d). The pits from adjoining cells converge, and would form continuous canals, were it not that the primary cell-walls persist as a closing membrane between two converging pits. In the structures known as “Bordered pits” (Fig. 1, B.C.D.) the pit canals are widened towards the closing membranes, the canals being thus conical or funnel-shaped, instead of cylindrical. Further, in “bordered pits” the closing membrane is thickened at the centre to form a “Torus” (Fig. C.D., t, t'). By the coming to one side or the other of the closing membrane, the torus may so act as to close the orifice of the pit canal (Fig. 1, C). Bordered pits therefore act as valves and are only formed in cells, which are soon to lose their protoplasmic contents, and serve only as channels for conducting water.

We may divide the elements of secondary tissues, according to their functions, into two broad classes:—1. The tracheal elements (Fig. 4, A), which lose their protoplasmic contents very early, have walls provided with circular, or obliquely elongated bordered pits, and serve as water conductors, being the channels along which water absorbed from the soil by the roots is transported to the leaves.

2. The Parenchymatous elements (Fig. 4, B) which retain their cell contents indefinitely, and contain starch, glucose, and other reserve food material, or, losing their cell contents, ultimately become filled with air and serve a purely mechanical function in the economy of the stem.

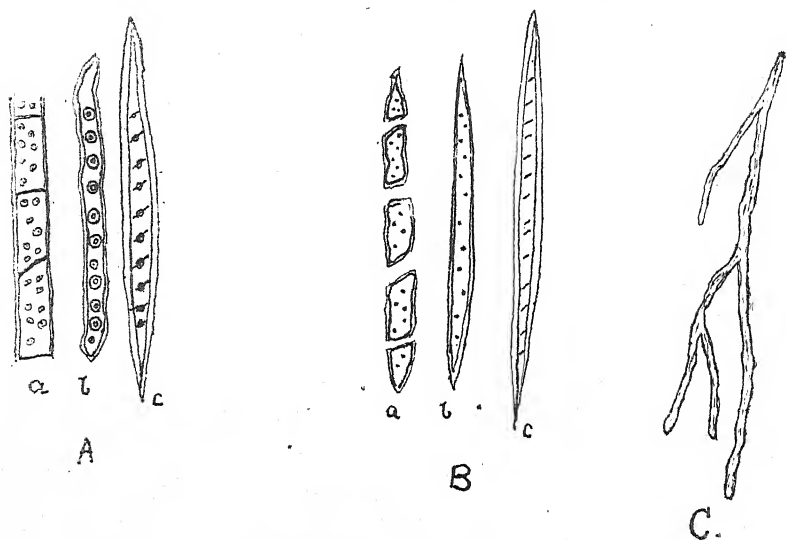


Fig. 4.

FIGURE 4.

- A.—Tracheal elements of the wood. *a*—Portion of a trachea or vessel; *b*—A tracheid
c—A fibre tracheid.
 B.—Parenchymatous elements of the wood. *a*—Wood parenchyma; *b*—A fibrous cell or
 intermediate wood fibre; *c*—A libriform or true wood fibre.
 C.—Portion of latex tube.

The walls of all such elements are provided with round or elongated simple pits.

The tracheal elements include:—

Tracheal or vessels formed by the fusion of several cambium cells, with bordered pits, thin walls, and wide lumens. They form a system of long, extremely fine tubes traversing the wood strands of broad-leaved species, and appearing as pores in a transverse section of wood (Fig. 4, A, a).

Tracheids, formed from a single cambium cell, with blunt ends, comparatively wide lumens, and large circular bordered pits (Fig. 4, A, b).

Fibre Tracheids, formed also of a single entire cambium cell, with pointed ends, smaller lumens than in the tracheids, and small obliquely elongated bordered pits. In extreme cases they become filled with air, and exercise a merely mechanical function (Fig. 4, A, c).

The Parenchymatous elements (Fig. 4, B) include:—

Wood parenchyma, nearly isometric cells, formed by the transverse division of cambium cells. They are provided with simple pits, and retain their protoplasmic contents for an indefinite period. In sap or living wood they generally contain in addition starch and other carbohydrates (Fig. 4, B, a).

Fibrous cells, or intermediate wood fibres, resembling wood parenchyma in their cell contents and their cell walls, but elongated and formed of an entire cambium cell. (Fig. 4, B. h.)

Libriform or true wood fibres: long, pointed cells with very narrow or almost obliterated lumens, and hard and thickened walls provided with obliquely elongated simple pits. They are exceptional members of their class in that they lose their cell contents very early, are filled with air, and only serve a mechanical purpose, contributing largely to the hardness of wood, and the rigidity of the stem. (Fig. 4, B. c.)

Both geological and botanical evidence lead us to infer that conifers existed on the face of our planet before plants of the broad-leaved class. They represent an earlier and simpler type of vegetation. In their stems, leaves and fructification they exhibit a less elaborate and more elementary structure. It is well to remark here that the wood of conifers, being of a simpler construction, more easily deteriorates in its

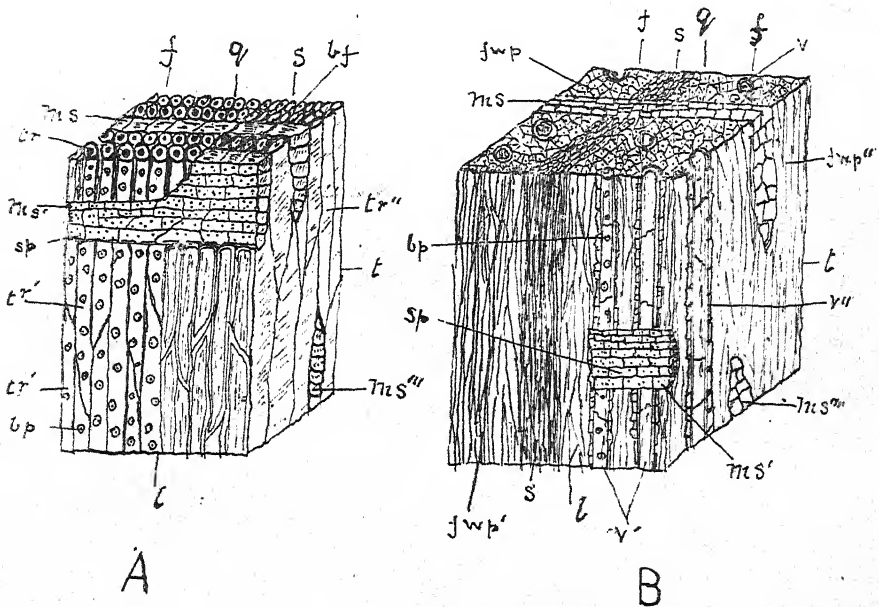


Fig: 5

FIGURE 5.

Diagrammatic representation of a piece of wood. A.—Of a conifer. B.—Of a broad-leaved species. Both highly magnified. *q*—Transverse view; *t*—Radial view; *t*—Tangential view; *f*—Early wood; *s*—Late wood; *ms*, *ms'*, *ms''*—Medullary rays in transverse, radial, and tangential view; *bf*—Broad fibres of the conifers; *tr*, *tr'*, *tr''*—Tracheids in transverse, radial, and tangential view; *fwp*, *fwp'*, *fwp''*—Transverse, radial, and tangential view of wood fibres, and wood parenchyma in wood of a broad-leaved species; *v*, *v'*, *v''*—Transverse, radial, and tangential view of vessels; *bp*—Bordered pits; *sp*—Simple pits.

timber value than that of broad-leaved species, as a result of faulty cultural treatment. How this is brought about will be explained later. The wood strands of conifers consist almost exclusively of tracheids, closely interlocked by their ends becoming pushed between one another. Wood parenchyma is also present, investing the tracheids. The water-conducting tracheids abut upon the living parenchymatous elements, and are in communication with them by means of their bordered pits. (Fig. 3, A. and 4, A.)

The tracheids formed early in the growing season—the spring wood—when growth is most active, have larger lumens and thinner walls than those formed later in the growing season—autumn wood. The tracheids of the autumn wood are much broader in their tangential than in their radial directions, and are sometimes termed “broad fibres” (Fig. 5, A. s.).

In addition to tracheids and wood parenchyma, the wood of certain conifers, e.g., the Pines (*Pinus insignis*, *Pinus pinaster*) contain resin ducts (Fig. 3, A. h.). Resin ducts are long passages or canals traversing the wood strands and situated principally in the late or autumn wood. The ducts are surrounded by cells which secrete resin, which collects in them. On a transverse section of the stem, such ducts appear as pores in the wood, from which—in freshly-cut wood—fluid resin exudes.

The wood strands of broad-leaved species exhibit a more elaborate structure. In addition to the tracheids and wood parenchyma, there are present the characteristic vessels or tracheae which appear as pores in a transverse section of the wood and the various forms of wood fibres already described. As in the wood of conifers, the different elements are firmly locked together, the water-conducting elements abutting upon those with living contents, with which they are in communication by means of their bordered pits. (Figs. 3, B. and 5, B.)

The elements with wider lumens, particularly the vessels, are most abundant in the early or spring wood. On the other hand, in the late or autumn wood the elements with narrow lumens and thick walls, particularly the true wood fibres, predominate.

Although as a rule the tracheae or vessels occur in nearly all broad-leaved species (they being absent in conifers, which fact affords a ready means of differentiating between wood of the two classes), all the other elements need not, however, be present in one and the same species. For instance, in the Willows and Poplars the tracheal elements are represented solely by vessels: Whenever in any species the true wood fibres form a comparatively large proportion of the elements of the wood strands, they must obviously greatly enhance the firmness and hardness of the wood. In oak wood such fibres comprise most of the late wood. In such soft woods as the mango they are entirely absent, or but sparingly represented.

The distribution and properties of the tracheal and parenchymatous

elements in the wood strands of conifers and broad-leaved species may be summarised as follows:—

The tracheal elements predominate in the early or spring wood, when water-conduction is most important. They function as water carriers, being the channels through which water is conducted from the soil to the leaves. In performing this function they are assisted by the living parenchymatous elements, which invest them in a sheath. This fact is important physiologically. All attempts to explain the ascent of water from the soil to the tops of all trees by such purely mechanical laws as capillarity, etc., failed; and it was only when scientific men began to recognise that the water-conducting elements were in intimate communication, by means of their bordered pits, with the living elements which accompanied them, and a practical solution to the problem became possible.

The parenchymatous elements predominate in the late or autumn

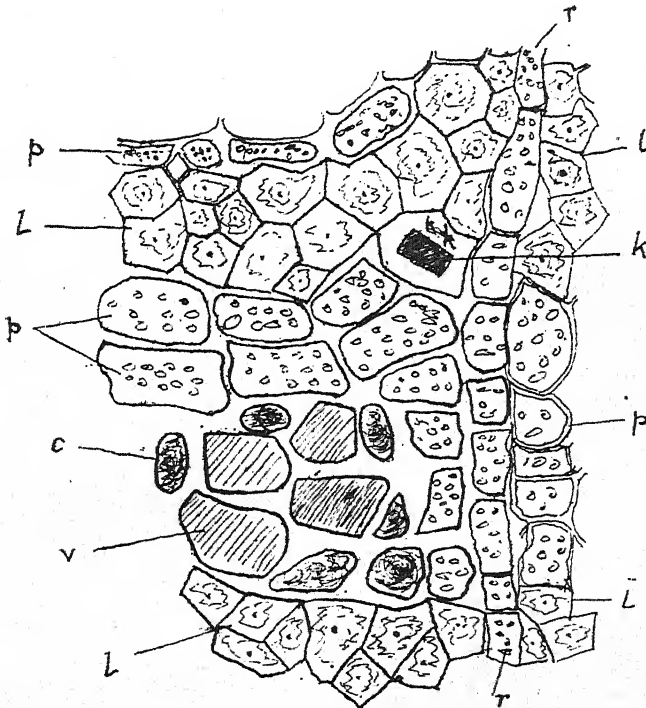


Fig: 6.

FIGURE 6.

Portion of the transverse section of the bast of the lime (*Filia parvifolia*). *c*—Sieve tubes; *c*—Companion cells; *k*—Cell of bast parenchyma containing a crystal; *p*—Bast parenchyma; *l*—Bast fibres; *r*—Medullary ray.

wood, when storage of reserve food material for consumption at the renewal of the ensuing growing season is important. In addition to their protoplasmic contents, they contain starch, sugar, and other carbohydrates, and, in smaller quantities, even proteids.

Finally both classes of elementary organs aid in maintaining the elasticity and rigidity of the stem; and in their extreme development produce such elements as the fibre tracheids in the one case, and the "true wood fibres" or the "libriform fibres" in the other, which are only capable of performing purely mechanical functions.

(d) Elements of Secondary Growth in the bast strands of Conifers, and Broad-leaved species.

As in the case of the wood strands, the elements of the bast strands may be divided into two broad classes:—

1. The sieve-tube elements: consisting of sieve-tubes or bast-vessels, resembling the wood vessels in that they consist of long, fine tubes formed by the fusion of several cells, but differing from them in retaining their protoplasmic contents, and in the partition walls between the several cells being perforated in a sieve-like manner, instead of being altogether absorbed (Fig. b. v.); companion cells: elongated parenchymatous cells with abundant cell contents, arising together, and closely associated with the sieve tubes. (Fig. b. c.)

2. The parenchymatous elements, consisting of bast parenchyma, resembling wood parenchyma (Fig. 6, p.); bast fibres, long, narrow, fibres with strongly thickened walls. (Fig. b. l.)

In the Conifers, companion cells are always absent, while the bast fibres may or may not be present. In the bast of trees the different forms of elements generally form alternating bands, e.g., the Lime (*Tilia parvifolia*). (Fig. b.)

The sieve-tubes conduct down the stem the proteid substances of sap elaborated or manufactured in the leaves; while the storage and conduction of the carbohydrates devolves upon the bast parenchyma. These cells also contain various by-products, such as calcium oxalate and tannins, evolved during the manufacture of the food substances; and sometimes alkaloids, such as quinine found in the bast parenchyma of the Cinchona (*Cinchona succirubra*). In species utilized commercially for the extraction of tannin—e.g., the Black Wattle (*Acacia decurrens* v. *molissima*)—the percentage of this by-product in the cells of the bast parenchyma is high.

Bast fibres contribute to the rigidity of the bast structure. On the number, variety, strength and length of these fibres depends the commercial value of the bast of such species as the lime (*Tilia panifolia*) and the Rhea or Ramie (*Boehmeria nivea*), and other species.

In many plants of such botanical families as the *Urticaceae*, *Euphorbiaceae*, *Asclepiadaceae*, *Apocynaceae*, and a few others, there are found associated with the elements of the bast strands structures known

as laticiferous vessels and laticiferous cells. (Fig. 4, C.) The former are long, simple or branching tubes with anastomosing ends formed by cell fusion. The latter are much elongated and sometimes branched single cells. Both structures contain a milky, often coloured, sap, termed "latex." The latex of several species contains characteristic ingredients. In the rubber-producing plants—e.g., Para rubber (*Hevea Braziliensis*), India rubber (*Ficus elastica*), the Ibungu Vine (*Landolphia kirkii*), yielding our Colonial rubber, and many others, the latex contains caoutchouc, which forms the staple of rubber. The latex of the Poppy (*Papaver somniferum*) contains opium; that of the Papaw (*Carica papaya*) peptonising ferments, and that of certain Aselepiads, poisonous alkaloids.

(e) The Medullary Rays.

The medullary rays consist of nearly isometric, or brick-shaped parenchymatous cells. (Fig. 5, ms. ms'. ms''). They form radial bands of living tissue, intersecting the wood and bast strands, and thus link together the living elements of the wood and bast. (Fig. 3, ms. ms'. ms''). They are in intimate communication with the conducting elements of the wood conveying the crude sap to the leaves, and those of the bast, conveying downwards the elaborated or manufactured sap. They thus form a means of communication between the two great systems of sap circulation in the stem, drawing away from the cells of the bast prepared food material to nourish the cambium, and the living elements of the wood.

In many, if not in all, pines and a few other conifers, the medullary rays are traversed by horizontal resin ducts. These ducts communicate with the vertical ducts in the wood, and by this means resin exudes readily from surface wounds made in their stems, e.g., *Pinus pinaster*, *P. australis*, *P. longifolia*, *Picea excelsa*.

The contents of the medullary ray cells are similar to those obtaining in the parenchyma of the wood and bast strands.

(f) Annual Rings.

If a cross-section of a "deal" or yellow-wood plank or scantling were examined carefully, the surface would be found to be divided up into a number of zones composed of alternating bands of lighter and loose-textured, and darker and firm-textured tissue. The surface of cross-section of a piece of wood of most of our indigenous mid-land broad-leaved species would exhibit a similar differentiation. In the transverse section of a stem, these alternating bands of tissue take the form of nearly or quite concentric, complete zones or rings; the limits between the successive rings being in a great number of cases so sharply defined as to be visible to the unaided eye. (Fig. 3.) Such rings are popularly called annual rings; and, where they in reality express annual instalments of growth, are used to compute the age of the tree, each

annual ring being represented by a zone of light and a succeeding zone of darker-coloured tissue.

Annual rings are expressions of the periodic activity of the cambium, occasioned by regularly recurring climatic variations.

With us, the rise in atmospheric temperature, and the renewal of the annual rains heralding the spring, exert upon vegetation a stimulus, to which they respond by a renewed activity in growth. The part of a tree, particularly of one standing in a forest, to be earliest affected by such a stimulus, is the crown. The shoots elongate, and expand their leaves rapidly, seeking to present a large leaf surface to the influences of air and sunlight. The tree at this early stage of renewed growth depends for its food supplies very largely on the stores of nutriment packed away in the parenchyma of the wood and bast strands, and the medullary rays.

The cambium is more slowly healed and becomes active later than the crown. Water conduction being most important during the stage of active growth in the shoots and leaves, the cambium cells produce largely tracheal elements, the tracheids in conifers, and the vessels and other forms of tracheal elements in broad-leaved species. Since the food supply available at this early period is limited, and a larger and more important demand exists for it in the crown of the tree, the cambium tissue at this stage is but poorly nourished, and produces loosely aggregated elements with thin walls and wide lumens. Wood of this nature formed early in the growing season is termed the "early" or "spring" wood, and in a cross-section of the stem is represented by the lighter-coloured and loose-textured zones of tissue. (Figs. 3, A. f. and 5, A. f.) In broad-leaved species the spring wood is also characterised by the vessel pores exhibited in a cross-section of the stem. (Figs. 3, B. f. and 5, B. f.) Such pores are less frequent, or altogether absent in the later formed wood.

Toward the latter end of the growing season, there is a change in the general order of things. The twigs and leaves have matured, and the crown presents its full extent of leaf surface to the action of sunlight and air. While on the one hand the demand for large food supplies in this quarter is at an ebb, on the other the leaves themselves manufacture a large quantity of such material. The result is an enhanced flow of elaborated sap down the stem, chiefly along the conducting tracts of the bast. The cambium is now better nourished than earlier in the season, and responds by producing wood of a dense texture, consisting of elements with thicker walls and narrower lumens. Moreover, water conduction to the crown now being not so important, the parenchymatous and rigid maintaining elements predominate. Such wood formed late in the growing season is termed the late summer or autumn wood, and is represented on the surfaces of cross-sections of stems as zones of darker coloured, and generally firmer textured wood. (Figs. 3, s. and 5, s.) In the *Coniferae* the late wood consists largely of thick-walled wood

parenchyma, and tracheids with thick walls and radially compressed lumens. In broad-leaved species the vessels, when present, are fewer in number and possess narrower lumens than in the early wood; while the different varieties of the parenchymatous elements abound.

A purely mechanical factor exerts a secondary influence in effecting the differences in texture between early and late wood. During the winter the outermost layers of the distended cortex crack, and exfoliate as dead bark. At the commencement of each growing season, therefore, the cortex fits round the wood of the tree as a comparatively loose jacket, and exerts very little pressure upon the wood. With the gradual increase in the girth of the tree during the growing season, resulting from the new layers of wood and bast laid on through the activity of the cambium, the cortex towards the end of the growing season fits very tightly, and must exert an enormous pressure upon the cambium and wood. The wood elements formed later have therefore little room for loose aggregation, and fit closely, forming a dense-textured fabric. Hence in the *Coniferae* we get those characteristic "broad fibres" with tangentially elongated lumens in the late wood. (Fig. 5, A. s.) This is obviously the shape a tube in such a position would take, when subjected to considerable radial pressure.

Where growth proceeds uninterrupted throughout the year, annual rings, are, as a rule, not evident. This obtains with the majority of tropical species. Even in the tropics, however, where regular and recurring interruptions of growth are caused by periods of drought, followed by a renewed activity occasioned by the return of the annual rains, trees may exhibit distinct annual rings. Examples occur in many Indian species:—Teak (*Tectona grandis*); Toon (*Cedrela toona*); Satin wood (*Chloroxylon sweetenia*); the Bread tree (*Melia Azedarach*), and many others.

In other tropical species again—*e.g.*, the different species of the genus *Ficus* (Figs) in at least one Australian species, *e.g.*, the Beef-wood (*Casuarina*) and in the Indian Evergreen Oaks, *e.g.* (*Quercus lamellosa*)—cross-sections of the stem exhibit what are known as "false rings." Such rings do not mark annual instalments of growth; and are revealed as complete or incomplete concentric or excentric zones of soft tissue, largely wood-parenchyma traversing the general structure of the wood. If a transverse section of a piece of wood of either the wild fig (*Ficus* sp.), growing as a climbing parasite in the forests, or of the Australian Beef-wood (*Casuarina*) were closely examined, it would be seen that each "false ring" could not very easily be confounded with the annual rings.

(g) Heart and Sap Wood.

The living elements of wood may remain active throughout the whole of the wood, extending even to the pith. Such wood is composed entirely of sap, or splint wood. Generally, however, the living

elements in the older zones of wood die, so that only dead tissues are found at a certain distance from the cambium. The dead portion of the wood is then termed the Heart-wood or Duramen, in contradistinction to the younger zones of wood, still containing living elements, and termed the Sap-wood or Alburnum.

Heart-wood is of two kinds:—

(1) True or complete heart-wood: in which the walls of the elements become charged, or their lumens filled, or both, with various substances secreted by the living elements shortly before death. Such heart-wood is therefore of a darker colour than, and easily distinguishable from, the sap-wood. Owing to the presence of these materials in the cell walls and lumens of its elements, true heart-wood is heavier than sap-wood.

(2) Incomplete heart-wood, consisting wholly of dead tissues, but of lumens of its elements, true heart-wood is heavier than sap-wood.

Heart-wood, consisting as it does of dead elements, does not take part in any of the processes vital to the tree. Its function is mechanical, contributing to the elasticity and rigidity of the stem. It does sometimes act as a reservoir for the storage of water. Hard-wood contains very little or no reserve food material such as starch and proteids, and is therefore less exposed to the attacks of fungi and wood-destroying insects than sap-wood.

The materials impregnating the cell-walls, and filling the lumens of the elements of heart-wood, consist of gums, tannins, oleo-resins, essential oils, etc. The tannins impart to the wood a reddish or brown hue. When converted into the so-called Xylochromes or wood-dyes, they produce woods of various hues, e.g., Ebony (*Diospyros ebenum*) with a black heart-wood, Campeachy wood or dog-wood (*Haematoxylon campechianum*) with a blue heart-wood.

Inorganic substances may also be found in heart-wood, e.g., silicic acid in teak; calcium carbonate in *Terminalia glabra*, an Indian species. These foreign materials have for their object the preservation of wood from decay. We prolong the life of such easily destructible wood as the pines and yellow-wood by artificially introducing into the walls and lumens of the wood elements a substance with antiseptic properties, such as heavy tar-oil. This process—when tar-oil is the antiseptic medium—we term “creosoting.” Nature achieves the same end by introducing into the elements of heart-wood, by natural means, such substances as gums, oleo-resins, tannins, essential oils, etc. Abstracted from all other technical virtues, the greater durability of equally seasoned and matured wood of one species over that of another, when exposed to the same set of conditions, is therefore not referable to any superiority in the chemical or molecular composition of its elements—both being identical in this particular—but to the presence of some preservation material, subsequently introduced into the walls, or lumens, or both, of the elements of the one, but lacking in the other.

(4) Bark.

The concentric zones of secondary tissues are not deposited, as we are now familiar, round the periphery of the stem, but between the wood and bast portions of the vascular strands. Consequently, it is obvious that unless latitude were given for the continued deposition of the wood and bast zones resulting through the activity of the cambium, growth in thickness of the stem must cease. The peripheral tissues of the stem first met this necessity by subsequent circumferential growth and by mechanical distension. Ultimately, however, complete or partial zones, or arcs, of the outermost peripheral tissues die and become cast off from time to time as bark.

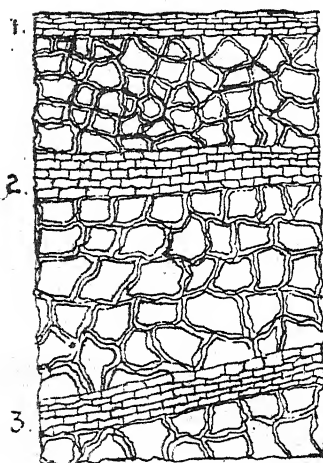


Fig. 7.

Transverse section of a portion of the peripheral tissues of a stem. 1, 2, 3—Successively formed layers of cork.

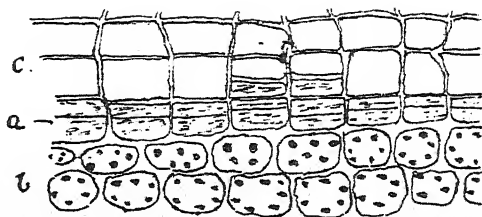


Fig. 8.

FIGURE 7.

FIGURE 8.

Periderm. *a*—Phellogen or cork cambium; *b*—Cells of the phelloderm containing chloroplasts; *c*—Cork cells.

A bark originates in the following manner:—A formative or generative tissue arises as a secondary meristem in the parenchyma of the peripheral tissues. Such a secondary meristem is termed the Phellogen or Cork Cambium. (Fig. 8, *a*.) Through the activity of its cells it generates on its outer side rows of cork cells (Fig. 8, *c*); and on its inner side a loosely aggregated parenchyma tissue termed the Phelloderm. (Fig. 8, *b*.) The cells of the phelloderm usually contain chloroplasts, *i.e.*, protoplasmic corpuscles impregnated with a green pigment termed chlorophyll, which is the green colouring matter of plants. The whole structure consisting of cork cambium, cork cells and the phelloderm, is

collectively termed the Periderm. (Fig. 8.) All tissues external to the periderm are effectually cut off from food supplies, and consequently die, and are cast off by the continued growth in thickness of the stem. Before death the cells lose their protoplasmic and food contents, and become filled with waste products.

Bark, then, in its strictly botanical significance, constitutes all peripheral tissues of the stem external to the periderm. In general, commercial and popular language, however, the term has a wider significance. It refers to all peripheral tissues external to the cambium, and therefore includes the tissues of living bast concerned with processes vital to the tree, and containing cells charged with various food products such as proteids and carbohydrates, and by-products, as tannin. While, therefore, the removal of what is strictly known as bark, is not attended with injury to the tree, the complete stripping of the cortex, or bark in its latter significance—as is done in the wattle industry—results in the death of the tree.

When the external green surface of a stem or a shoot begins to turn brown, it indicates the commencement of the formation of periderm. The first layer of phellogen generally originates in the primary cortex. With the death of the tissues external to it, this layer of phellogen ceases its activity, and another is developed in a deeper-lying layer of peripheral tissue, until ultimately the phellogen comes to be joined in secondary bast parenchyma, instead of the primary tissues. (Fig. 7.)

If the layers of periderm formed constitute only arcs of the stem circumference, the bark is exfoliated in scales—*e.g.*, common yellow-wood (*Podocarpus elongata*). Bark of this nature is termed “scaly bark.” When, on the other hand, the successive periderm layers form complete concentric rings, the bark is detached as a hollow cylinder, and ultimately cracks and is thrown off through the continued growth in the thickness of the stem, *e.g.*, real yellow-wood (*Podocarpus Thunbergii*), the grape vine, clematis, etc. Such bark is termed “ringed bark.”

Under the four headings, the cell, the primary tissues, the secondary tissues, and bark, I have now completed the interpretation of the structure of an exogenous stem, I trust in the manner outlined in the introduction to this article. In a future instalment I hope to deal broadly with the leading cultural features in the growing of trees for timber, inferable from a study of the structure of the stem; and to outline such structural differences as are adopted as features, both in the classification and identification of wood.

Mr. St. George Arbuthnot has been re-appointed a member of the Land Board, for a period of three years from the 1st July, 1907.



Locusts in July.

EXCEPTING for minor changes in the location of the swarms, the position of locusts in Natal and Zululand at the end of July was practically the same as in June.

There is ample justification for saying that, up to date, the Colony has not been invaded from beyond its territories. Large swarms located early in the month in the Umkusi and Pongola Thorns (Ngotshe Division) have crossed into Zululand, probably owing to the burning of the veld, and this is the only instance of a well-defined migration. In all, about 50 swarms have been reported, and it is very doubtful whether there are at present 100 swarms in our territory. There is no marked trend of flight; 7 reports show the swarms as settled, 5 as circling about in the neighbourhood, 12 as flying northerly, 15 as southerly, 3 as west and 1 east.

The condition of the locusts reported upon shows them to be generally healthy. Some sick specimens from Zululand were found infested with nematodes or worm parasites. The colour of the underwings is still clear, being only slightly suffused with pink at the base. The locusts are, generally speaking, all dark in colour, but one or two "light coloured" swarms have been reported.

Upon the whole the swarms are not large, nor is any considerable mischief being done by them. Several swarms of some magnitude have been doing a good deal of damage at Mid-Illovo Central to wattle plantations. A swarm was reported by Mr. H. Blofeld, as extending from Amatikulu Drift towards Eshowe, Zululand, a distance of 12 miles, on the 18th.

Excepting for a few stragglers in the veld, there are no locusts in the Northern Territories (Paulpietersburg, Utrecht, Vryheid, Babanango and Ngotshe Divisions).

Northern Zululand (Ingwavuma and Ubombo) is quite free, and has been so since the locusts were swept off by disease. As this area has

been regarded as the wintering ground of the locusts, the present position in regard thereto is most satisfactory.

The Magisterial Divisions of Mahlabatini, Ndwandwe, Hlabisa, Emtongjaneni, Eshowe, Lower Umfolozi and Mtunzini, are all infested with flying swarms, the greatest number seemingly frequenting the Emtongjaneni Division.

In Natal, the Coast lands from the Tugela to the Umzimkulu River are remarkably free from flying locusts, but from Mapumulo in the north right through to Alfred County swarms exist in country at an elevation of from 500 to 1,500 feet above sea level.

For the week ending July 20th, "nil" returns were sent in from the following Police Stations:—Imbizane, Umtwalumi, Ixopo, Umtamvuna, Scottsburg, Durban, Hill Crest, Avoca, Tongaat, Umhlali, Greytown, Keat's Drift, Maputa and Ndumu. For the week ending July 27th, the following stations sent in "nil" returns:—Maputa, Ngutu, Inadi (Krantzkop), Stanger, Avoca, Durban, Hill Crest, Lower Umkomaas, Harding, Ntabankulu (Vryheid), Weenen, Umzinto, Equeefa and Mtunzini, Inchanga and Babanango and Ingwavuma.



LOCUST FUNGUS AND PARASITES *v.* DESTRUCTION.

It has been recently put forward that the destruction of locusts by poisoning and mechanical means tends to the permanency of the pest, because by destroying the insects the increase of the natural enemies is prevented. This contention is, upon the face of it, a plausible one, but it is only right to point out that the facts of the case do not support it in any way. Granting that such is the case, for the sake of argument, then it is because of the extensive measures taken in Natal for the past five or even nine years to destroy locusts by poisoning that the pest is still abundant and troublesome. And if this be so, then in the other Colonies—where such measures have not been adopted—locusts should be at a discount, because the natural enemies have had every opportunity of increasing. But this is not so. Natal suffered from an abundance of locusts last summer, and so did the Transvaal, the O.R.C. and Basutoland. It matters nothing that the species differs from that which invades Natal; indeed, it rather gives point to the futility of the contention, because the Brown Locust is subject to the attack of more natural enemies than the Red Locust.



LOCUST FUNGUS.

THE LATEST DEVELOPMENTS.

Anyone who has followed the controversy upon the desirability of using locust fungus and has studied the conflicting opinions by qualified observers regarding it and the unsatisfactory results attending its experimental use, could not help being struck with the unanimity of opinion amongst South African Entomologists upon the futility of using locust fungus as a practical means of combatting the pest.

The secret of all this disagreement has been exposed by Mr. Pole Evans, Mycologist and Acting Botanist of the Transvaal, who has been giving the matter his especial attention. Mr. Evans discusses the matter fully in the last issue of the *Transvaal Agricultural Journal*.

Briefly, he has discovered that the fungus that destroys the locusts can only grow upon live locusts and cannot be cultivated artificially. Hence contagion only takes place when a live locust by contact or otherwise is inoculated by the spores or seeds of the fungus that develop upon a locust. Further, the fungus which has been prepared from locusts dead of the disease, upon artificial media, is one that only grows upon dead locusts and is incapable of infecting them with disease. This fact explains a great deal, and at the same time shows why it is that when locusts which have died from the disease are used for spreading it, good results often accrue.

The light which Mr. Evans has by his minute studies been able to throw upon the subject may lead to a practical application of this natural check upon the insect with successful results.

To the lay mind it may seem extraordinary that this point has not been elucidated before, but in this connection it must be borne in mind that there is no more difficult and complicated a study than that of the fungi, that but very little is known of any fungi, and that, lastly, Mr. Evans is the first working mycologist that we have had in South Africa.



HORSES KILLED BY BEES.

Mr. P. Otto, J.P., Otto's Bluff, has kindly furnished details of the loss of certain of his horses through the attack of a swarm of bees, reports of which appeared recently in the daily Press. In the course of his letter Mr. Otto says:—"About sundown on the 28th ult. a swarm of domestic bees attacked five of my veld horses, which had just been put into a cow shed for a feed. A mare and her eight-months-old foal by

'Old Fuss' were put in a place 16 x 22 feet to be fed by themselves. Ten minutes after I saw the boy running from the sheds with a sack over his head. I knew at once it was the bees. I rushed down and let three of the horses out, but the mare and foal were then already down. I managed to get them up and out of the place. They would rear up and chop in the air with their fore feet, throw themselves down, lie as if dead for a minute or so, and groan, then jump up into the air again. They appeared to me to be choking, and the next morning they were both dead, but the other three were all right."



LOCUSTS IN ARGENTINA.

In the May issue of the *Journal* appeared a note stating that the Argentine Government was about to issue a loan of two million paper dollars for the purposes of locust destruction. This, based on a Press cable, furnished an inkling of the more or less seriousness of the situation in that country with regard to the locust pest. From English journals arriving a mail or two ago, it appears that the locust question engages the attention of the public as of importance second only after the prospects of the crops. Anxiety, however, will not manifest itself seriously until the crops have made a certain growth. It is said by those who know the country well and who have practical knowledge of farming in Argentina, that if the locusts come very early—that is, when the wheat crop is young and green—they will do scarcely any damage. On the other hand, if the locusts come when the grain is just forming, when the stalk is green and soft, the damage is irreparable. In 1896 the locusts came just at the critical time, and the wheat crop was practically destroyed. Those most familiar with the country, however, say that it is very rarely indeed that the locusts come at precisely that critical time. They either come earlier or later. If they come very early, the damage is repaired; and if they come very late—that is to say, when the wheat is in the ear and the stalk hard—the locusts perish for want of food. Before perishing, however, they lay eggs, and it is the new locusts that do the damage to the mealie crop.

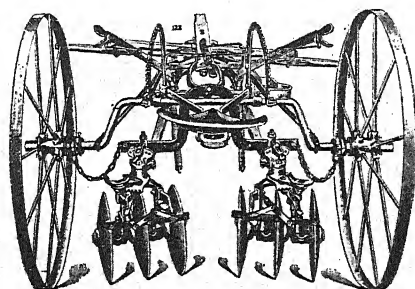
In the meantime, preparations are being made for carrying on an active campaign against the locusts. The chief effort will be directed against the young locusts, as it is their ravages that are most feared; and it is believed that, after the experience of the damage done to the maize crop in the winter and spring, every effort will be made to destroy the eggs as they are laid.

Lucerne and Other Machinery.

THE "MARTIN'S" CULTIVATOR.—MOLINE ROTARY LUCERNE CULTIVATOR.
—"CAPTAIN KIDD" DISC CULTIVATOR.—"ASPINWALL"
POTATO PLANTER.

IN the June number of the *Journal* there appeared an article by Mr. E. R. Sawyer on "The Cultivation of Lucerne," in which particulars were given of certain experiments conducted at the Weenen Experiment Station "with a view to demonstrating the advantages accruing from a system whereby the crop is drilled and regularly cultivated." Mr. Sawyer spoke of the "Martin" Cultivator as being the best machine for dry land cultivation; and for irrigated land he recommended the Moline Rotary Digger. By the courtesy of Messrs. Malcomess & Co., Ltd., we are able to publish herewith illustrations of these two implements.

The first illustration depicts the Moline Rotary Lucerne Cultivator. This implement is one which has been specially designed by Messrs.

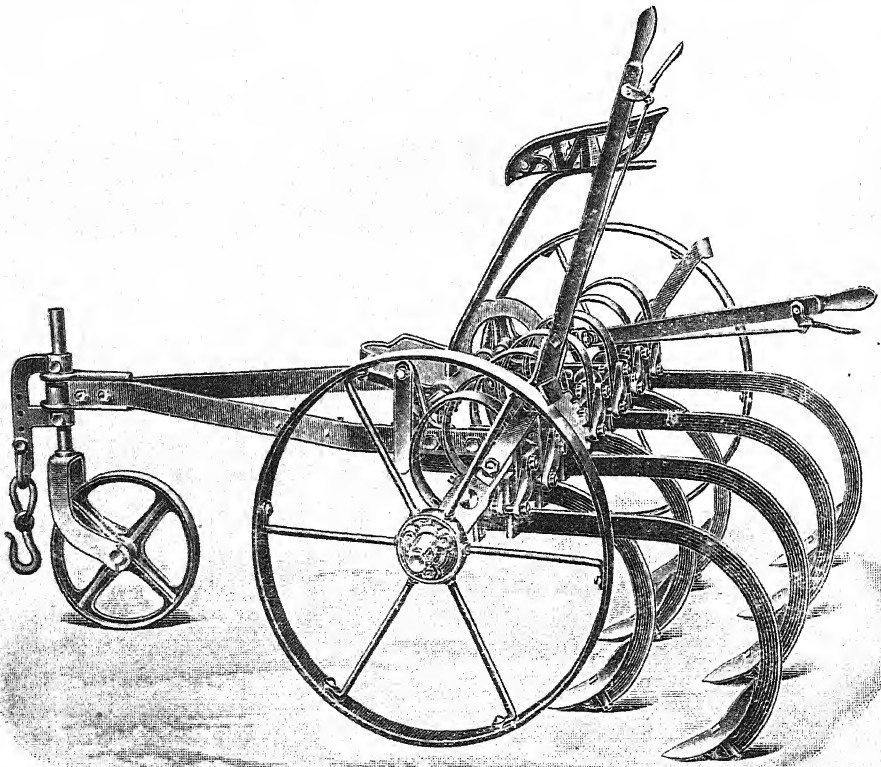


MOLINE DISC CULTIVATOR.

Malcomess & Co., Ltd., to meet the needs of lucerne growers in the Cape Colony with a view to overcoming the difficulty which has been experienced in obtaining a cultivator which, whilst capable of doing good work and thoroughly pulverising the soil, will not injure the lucerne plants in any way. The teeth of this Cultivator are set on a revolving drum; and the action is such that, after the teeth have penetrated to their full depth in the ground, the continued motion of the implement causes them to revolve out of the ground again before they meet with sufficient resistance to do any injury to the plants. The implement is not a heavy cumbersome one depending upon its weight to secure penetration, but by spring pressure a uniform depth of digging is accomplished. It is amply strong, being constructed of steel and iron of the best quality. The picker frame is held parallel with the ground by

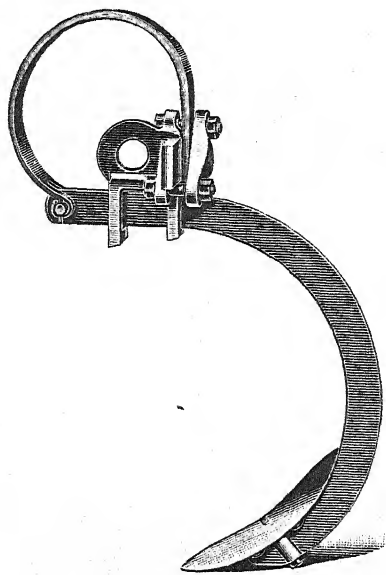
means of a yoke that connects the front end of frame and pole, and two rear yokes that attach to the axle. The pickers are of a special grade of hard steel, drop forged, and of perfect shape for their work. They have freedom of motion and, it is claimed, will not clog. To prevent clogging there is an opening at the side of each tooth, which permits the loose soil to escape instead of packing it at the front and rear and obstructing the free swinging motion of the teeth. The cushion spring and low hitch obviate any shock to the team. The wheels are 48 inches in height and have staggered spokes and removable boxes. There is a comfortable seat for the driver, and a sheet steel top is provided to guard against possibility of falling upon the digger. On account of the lifting spring little effort is required to raise the heads. The working width of the cultivator is 36 inches, and, it is stated, it has given excellent results in the Midland districts of the Cape Colony where lucerne is grown on an extensive scale.

For cultivating lucerne in very hard, unirrigated land, an excellent implement is the well-known "Martin's" Cultivator fitted with special



MARTIN'S CULTIVATOR.
Fitted with special diamond-shaped teeth.

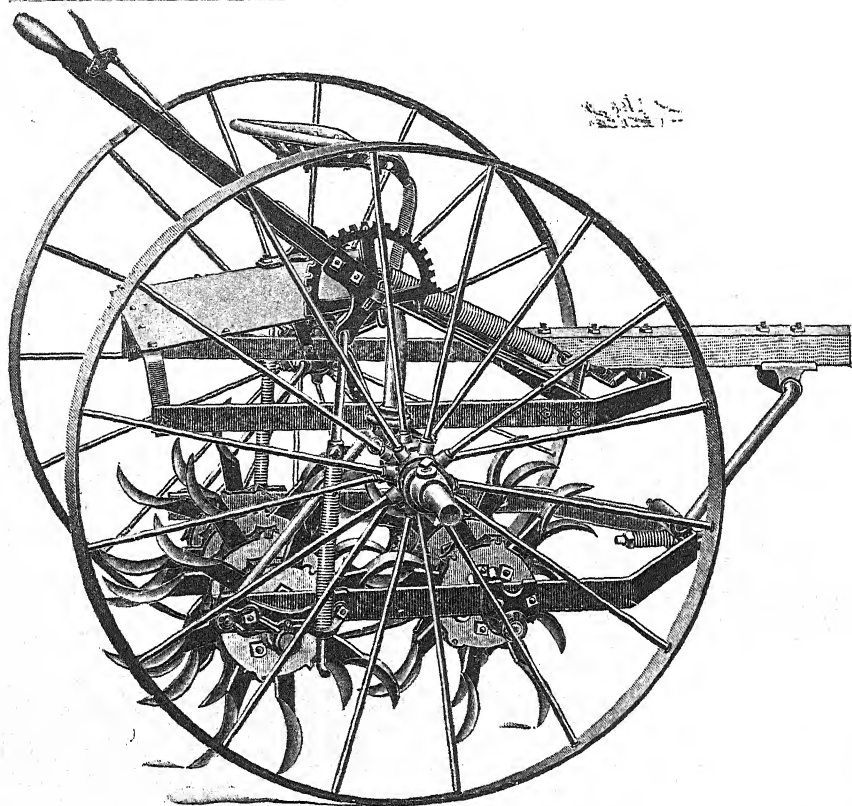
diamond-shaped steel teeth. For working under these conditions this implement has proved unsurpassed, and is now largely used by the majority of the principal lucerne growers of the Cape Colony. A separate illustration gives a closer view of one of the special diamond-shaped teeth of this machine.



A NEARER VIEW

Of one of the special diamond-shaped teeth fitted to the Martin's Cultivator.

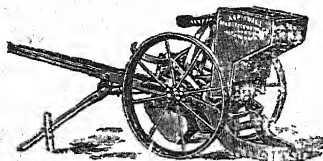
At the recent Durban Show, one of the most interesting exhibits in the machinery section was that of Messrs. Malcomess & Co., who are well-known to agriculturists in all parts of South Africa for their enterprise in the introduction of the most improved types of implements and machinery. Among the implements of special interest exhibited by them was the "Captain Kidd" Disc Cultivator. This implement is specially designed for cultivating mealies, and can also be used amongst sugar cane or any other similar crop. Being constructed almost throughout of steel, it possesses the maximum of strength whilst being very light. It is capable of numerous adjustments which can easily be made by the most inexperienced operator, and the implement is under perfect control. The axle is adjustable to permit of working between rows of different widths. The discs are controlled by a foot rest and can easily be moved from side to side and set to throw the soil either on to or away from the plants and at any angle desired; and it is claimed for them that they can be worked quite close to the plants without the least



"CAPTAIN KIDD" CULTIVATOR.

fear of injuring them. The general construction of the "Captain Kidd" is such that it can be worked among the mealies, etc., until they have reached such a height that the need for further cultivation is passed. An illustration of the machine is given herewith.

The "Aspinwall" Potato Planter also attracted a great deal of attention from potato-growers at the Show. This implement will, it is



"ASPINWALL" POTATO PLANTER.

stated, plant whole or cut potatoes at any desired depth or distance apart. It opens the furrow, drops the seed, covers it up, and also distributes fertiliser if desired, in one operation. The accompanying illustration gives a good idea of the appearance of the machine.

Agricultural Geology.

By PROF. E. H. L. SCHWARZ, A.R.C.S., F.G.S. Rhodes University College,
Grahamstown.

A PAPER READ BEFORE THE DURBAN TECHNICAL
INSTITUTE.

FOR some years past the various South African States have maintained geological surveys, and reports more or less detailed have been issued. In Natal here the survey has been discontinued and interest in the subject has been allowed to lapse. It struck me, therefore, that on my visit to Durban a useful purpose might be served if I briefly put forward some of the benefits that are derived from a geological survey. I had the honour to be with Dr. Corstorphine when the survey of Cape Colony was started in 1896, and spent ten years in wagon and tent working in Cape Colony. I have also been able to follow the work in the Transvaal from the beginning under Dr. Molengraaff, and in Natal under Mr. Anderson. In 1896 very little had been done and nothing on a systematic scale, while to-day the amount of literature is very considerable, so much so in fact that it is exceedingly difficult for a layman to see the use of all this outpouring of descriptions, theories and controversies. Where is the practical benefit? In these hard times it is legitimate and necessary for people to make this enquiry, and unless a satisfactory answer is forthcoming it is quite right that no more funds for geological survey should be granted.

Well, there are many sides which I could touch on. First of all the educational side—for a knowledge of one's country, its physical history and mineral wealth helps one immensely in grasping the problems of population, rail and roadways, distribution of natural products and so forth. Secondly, there is the mining side of geology—and here, in a country that is dependent on its gold, diamond and coal mines, one would surely think that a scientific and trustworthy knowledge of these would not have to plead indulgence; yet the ordinary investor points to the fact that most of the mineral discoveries have been made haphazard, and just at the present time, with so many bogus schemes on hand, the speculator dreads an authoritative report by a trained geologist. The answer to the charge that no geologist has discovered a mine lies naturally in the fact that the country has not been surveyed and studied; at the present time we know roughly about one-fifth of South Africa from actual survey, and that amount has taken twelve years to accomplish. The side, however, I wish to deal with now is neither of these; it

is the more humble one of agricultural geology, the knowledge of the soil and the rocks from which it is derived.

On the quality of the soil depends the value of the crops reaped from off it and the cattle that have grazed over it, and, just as in mining, without enquiring what constitutes a good soil, the agriculturist has established certain estimates derived from a consideration of results, and points to these as quite sufficient for his needs. Now in South Africa we have peculiar conditions, and the main rule-of-thumb methods in farming are derived from experience in Europe; underlying all our South African farming there is this tradition of Home methods, which may or may not be applicable to South Africa, and herein lies the true use of agricultural geology; that is to say, if we can get to the bottom of the reasons why farmers do one thing at Home, we can see whether we are right in following the procedure here, or are simply wasting our energies in so doing. Take a case in point. It is a rule at Home not to plough up the subsoil. Now the reason for this is that in regions of constant rains the fine waste particules of soil become washed down and choke up the pore spaces in the subsoil, which thereby becomes un-aerated, cannot support the aerobic bacteria, and, as the farmers say, is "raw." If turned up in any quantity it spoils the tilth. In South Africa this process does not go on, except in the sour soils of the Table Mountain sandstone, and it is a fatal mistake to plough only to a limited depth as the subsoil is quite as productive as the surface soil.

There is a further reason why we should study our soils from a geological point of view. In Europe the soil has been worked over for centuries, and a definite relation between the soil and underlying rock has been maintained, so that waste of one has been made good by the supply from the other, and where that relation has not been the required one, people have had time to experiment and find what particular ingredients it is necessary to add in order to make the soil produce the required crops. In South Africa we are practically in a virgin land; most farms have lands which have never been touched with a plough or have never been manured. We have not had time to experiment with our soils, and besides, the population is so sparse that experience gained by one farmer is lost, or has been lost till quite recently, when there have been issued the excellent agricultural and farmers' journals. All the same if we realise what the soil is, what the rock underlying it is, we can go straight to the point and say to produce a certain crop we must add this or that ingredient or treat it in a particular manner.

There is still a third branch which lies slightly oueside my subject, but which of inquiry is closely connected with it, namely, the action of bacteria. I do not here refer so much to the nitrifying bacteria of which we have heard so much lately, but to the minute organisms which convert the inorganic substances in the soil into available plant food. In Europe the soil is thoroughly permeated with these germs; not only

do they convert the insoluble substances of the rock grains into soluble substances, but their glutinous excretions help to flocculate the soil, to keep the soil particles distended and thus maintain proper aeration. Thus a soil, exceedingly poor in plant foods when analysed, by the action of these bacteria is made to yield the maximum amount. In South Africa, on the other hand, there are soils, as, for instance, the red sand of the north-west of Cape Colony, which is an ideal soil when chemically analysed, yet, just because there are no bacteria present to act as intermediaries between the soil particles and the absorbent plant roots, nothing will grow there. In other words, in Europe the farmer can almost be independent of rock influence; here, on the other hand, we must look to our rocks as conveyors of plant food.

It is manifest then that a geologist regards soil as something very different from what a farmer does. How do we define a soil?

In the first place soil consists of a number of grains divided roughly into three grades: grit, ranging from grains 1 millimetre in diameter and upwards; sand, ranging from 1 millimetre to 1-100th of a millimetre; and colloidal clay, or the fine particles that remain suspended in water. According to the proportion of these ingredients, the soil is said to be sandy, loamy or clayey. These particles in the natural state exist in a very remarkable state of aggregation, except, of course, in barren lands where they lie simply huddled together. In normal natural soil the surface is permeated with fine roots and minute filamentous organisms which are constantly growing and dying, thereby creating a porous open surface. Below, the ordinary roots penetrate, and these likewise pushing out and growing in all directions, and eventually decaying and leaving open spaces, continue the surface porous spacing. The soil particles themselves do not collapse when a cavity is left, but remain in an open network arrangement, partly through the surface tension of the moisture that surrounds them, and partly by means of cementing material, either the glutinous excretions of bacteria or fungi, or actual calcareous or siliceous cement. The natural soil then is a sort of sponge or porous membrane which has definite properties, such as being strongly absorbent of water, easily permeable to solutions of soda, retentive of solutions of potash, and strongly absorbent to gases. The fineness of the particles naturally has a great influence on the fertility of the soil, because the larger the particles the larger is the aggregate surface exposed to the action of solvent solutions and bacteria; a tumblerful of ordinary fine clay, for instance, presents a surface of about $2\frac{1}{2}$ acres, while that of sand would only present one of a hundred square yards or so. But the solvent action eventually reduces some of the particles to the finest waste, and it is this that must be got rid of if the soil is to remain fertile. The process is a familiar one, worms being the most widespread means of carrying this waste to the surface, where it dries and blows away. The loss is made good from the underlying rock, which becomes

attacked by the solutions of organic acids, bacteria, etc., according to the demand from above.

This is natural soil, but this is just sufficiently aerated and drained to support the natural flora. In order to grow cultivated plants in the soil we must plough. Now the object of ploughing is to flocculate the soil more extensively than was the case in the natural soil, so as to bring a larger amount of surface under the influences of solution, and to do this we must stir it in the proper condition of moisture. If the soil is ploughed too dry there is not sufficient moisture round the particles to allow them to remain distended by surface tension, while if it is too wet, the particles simply float and settle as silt. In proper condition the particles will form themselves into crumbs or kernels, each containing a number of particles held together in a sort of open-work ball; the finer or more clayey the soil the larger will these kernels be, and consequently a clay soil contains when properly flocculated far more air space than a sandy soil. Lime helps immensely to flocculate the soil, and when flocculated the films of lime which become deposited on drying help to keep the particles distended. If there is no lime and insufficient bacterial life, the particles will fall back into a solid block, as may be seen on our own soils under the Drakensberg and on the Table Mountain sandstone, where the clods when dry become so hard that they require to be broken with a hammer.

With such an idea of the soil either natural or cultivated, we can see more clearly what is wanted in order to bring it into its maximum bearing capacity. In the first place we must look to the texture of the soil and see that the flocculation is maintained. In grazing land this is ruthlessly destroyed by grass fires. I know I must be speaking to unsympathetic ears when I advocate cessation of grass fires in this grass country, but the fact remains that by scorching the surface of the ground the natural aeration of the soil is destroyed; the bacteria which render the insoluble rock particles into available plant foods are burnt; the whole economy of waste and replacement, so beautifully balanced in Nature, is done away with, and the capacity for stock-feeding becomes less and less every year. It is not in my province to go into what ought to be done instead of burning, but the disastrous effects of this proceeding is so manifest all over South Africa that I cannot but lay stress on it.

In the second place, available plant foods resulting from decomposition of the rocks must be considered. In Natal all rocks, except the coarse Molteno sandstones under the Drakensberg, are rich in potential plant foods. The Table Mountain sandstone, unlike the same formation in the Colony, is practically an arkose or granite debris, owing to the ridge—the old Madagascar ridge—of granite lying so near from which the materials were derived out of which it is formed. Granite itself is the main source of all rocks, and consequently of all soils. Granite is composed of quartz, felspar and an iron-magnesium compound, horn-

blende or black mica for the most part. When the rock disintegrates the quartz falls apart as grains which form sands and sandstones. The felspar decomposes into a soluble portion consisting of potash, lime or soda, the last of which drains away naturally to the sea and helps to increase the natural amount of salt in it, or, in exceptional cases, as in the salt pans of the interior, it collects in certain places and is deposited; the lime and potash luckily are retained by the soil and help to form the first batch of available plant food. The insoluble portion of the felspars is aluminium silicate which forms clays, shales and slates. The hornblendes or micas yield iron and magnesium, which are easily soluble in organic acids, and the siliceous portion either dissolves as colloidal silica, when it becomes available to grasses and such like plants that require this material for their stems, or is deposited as cement among the other products of disintegration. In dolerites which form such an important feature as intrusions, and basalts which constitute the lavas of the Drakensberg, the felspars are lime-soda minerals with not potash, while the iron-magnesium mineral, in these cases, augite, is much more abundant than in the granites, and hence the iron content of the soil resulting from the breaking up of these rocks will be much greater. Derivative or sedimentary rocks are not so varied in their composition, except in some of the Table Mountain sandstones in Natal, which are made up of bits of granite with the minerals very little altered; derived for the most part from granite, the proportions of the ingredients varies with the transporting power of the water under which they were formed, sands and sandstones being laid down near the shore, and clays and shales further out; luckily, however, the sorting out is never perfect, and most sedimentary rocks contain a portion of the varieties of minerals in the original granite.

Phosphorus, a most valuable plant food, is obtained from the mineral apatite, a calcium phosphate, which exists as tiny needles in all igneous rocks, granites, dolerites, and basalts. It is very insoluble, and is rendered practically unaltered to the soil, where it becomes concentrated, as the other minerals waste away. The concentration never reaches a very large percentage as the original amount is so small, and besides it is ravenously sought for by the plant roots. How the insoluble phosphates are converted into plant food is unknown; there is probably a particular race of bacteria which is detailed to break down the phosphates. In Karroo alluvium, for instance, when dry, we can find only a bare trace of soluble phosphates, but when that same soil is moistened and brought into cultivation the amount of soluble phosphate is very large. The explanation of this is probably that the phosphate-eating bacteria have an encysted stage during which their living substance retires into minute horny shells and the organism aestivates; when the soil is moistened the horny shells break and the bacteria come out and begin feeding and propagating again. It is estimated that if

these bacteria multiply by simple division and have the normal rate of increase, namely, 35 minutes for each fission, one bacterium in twelve hours would be represented by four millions of descendents. I think these facts point to bacteria being the reason of the wonderful fertility of the Karroo soil when brought under cultivation, and if so it is one of the most striking cases where Nature jealously conserves her precious assets against the proper time, for when the bacteria are encysted no waste of the phosphates can go on. The phosphates are taken up by the plants, and converted into bone substance by animals. It is curious what hunger animals have for this element and how their condition depends on a proper supply. It seems that by constant cultivation we have reduced the amount below a healthy limit. In men there is decidedly a want of the substance in our ordinary foods, and phosphatic medicines are in increasing demand, such as the pink pills, phospherine and the like. This spasmodic supply, however, cannot be as beneficial as a natural and constant one, and hence it is desirable that more phosphatic lands should be brought under cultivation. The best phosphatic soils, however, the granite soils, are often considered poor, but this is simply a case where the plant foods lie idle and the proper intermediary bacteria have not been introduced. Nothing is known yet about these phosphorous-eating bacteria, but take the analogous case of *Azotobacter*, a nitrifying organism that lives on dried leaves at Home; every leaf that falls in Europe is covered with *Azotobacters*, and the amount of nitrates fixed in the soil under the tree is very considerable. Here no *Azotobacters* live or have been introduced; Hall found the organism in uncultivated soil from near Mombasa for the first time after examining for it all over South Africa, so that the organism seems to be creeping south along the East Coast, but meanwhile the leaves of our forests fall and wither and no benefit accrues to the soil. Here then is a definite case in which by bringing in bacteria we could increase the yield of our pasturage; and I think that if we could inoculate our granite soils with bacteria derived from soils which do yield soluble phosphates we should render them fertile, and also produce a marked benefit in the health and energies of the people living on the products of such soil.

I should like to drive home this question of bacteria. I call them bacteria because they are minute organisms living in aerated soil, but it does not necessarily follow that all of them are strictly speaking bacteria. Their capacity for eating is enormous, and the different species affect different diets; one has been isolated in the Black Sea which feeds on pure sulphur; it separates this element from the sulphates in the sea water, and minute globules of sulphur can be seen in the bodies of the bacteria. In the Steamboat Springs of Nevada another has been isolated which has a very human partiality for gold, and in the sintery deposit from the springs these tiny organisms can be seen with their bodies charged with fine specks of the precious metal. In soil

these organisms live in enormous numbers, as we can tell when new ground is disturbed, as in Rhodesia, where some of them unfortunately have been found to be disease germs. Or we can see the same thing if we sterilise soil with some disinfectant, when it immediately becomes barren. But direct investigation shows that they really do exist. Hohl has estimated that in a grain of soil in Switzerland the following numbers of bacteria live:—

Cultivated soil	5,750,000
Meadow land	9,400,000
Manure pile	44,500,000

These figures are important as they show how by cultivation we reduce the bacteria and consequently the power of soil to produce plant food from the inorganic substances, and we see how necessary it is to bear this in mind when manuring with chemical manures which are sterile. I have known of cases where basic slag has been distributed over fields of sour soil and no benefits have accrued; had a little stable manure been added the necessary bacteria for breaking down the slag would have been present and improvement of the soil resulted.

Then again some minerals are distinctly favourable to bacterial growth, just as others are the reverse; taking gypsum or calcium sulphate, the best of all, as 100, the effects of other minerals may be stated as follows:—

Gypsum	100
Sodium sulphate	47.9
Potassium sulphate	35.8
Lime carbonate	13.3
Magnesium carbonate	12.5

In normal weathering of rock a certain amount of soluble substances are produced which in the first place allow plants to begin to grow; but this is soon exhausted, and it is the residual rock waste which has escaped decomposition which forms the strength of the soil; it is the object of bacteria to break down this and complete the process of disintegration. The water of the atmosphere is charged with a very minute amount of carbonic acid; decaying vegetation, the humic content of soil, produces carbonic acid and some weak humic acids; but all these are practically useless for decomposing silicates as their action is so slow. In many of our sand-dunes, composed of broken fragments of shells, and therefore consisting to a very large extent of carbonate of lime, these weak acids are not even sufficient to decompose this substance, and the soil becomes sour, or at any rate supports the heath vegetation natural to sour soils. Conversely, in the great eruption of Krakatoa, in the Sunda Straits, when the whole island was reduced to a glowing mass of cinders and lava, Treub found that after two years the surface was slimy with minute organisms breaking down the rock into soil, and plants of all sorts were taking advantage of it.

Turning now to the question of water, another branch of agricultural geology of utmost importance, there is a great amount to be learnt by a careful study of the geological conditions. When rock is exposed to the surface of the ground it is subjected to alternating heat and cold due to the change from day to night, summer to winter, that is to say, daily and seasonal variations. When heated, rocks expand, and when cooled, contract, and just so far as the heat is enabled to penetrate so far will there be a movement of the rock substance over the inner portion which is not affected; hence in time rocks will tend to split along the junction. There is also the action of water which penetrates the cracks carrying oxygen and carbonic acid from the surface, and this decomposes certain of the substances in the rock with increase of bulk, or dissolves them leaving the rock substances cavernous. So the rock becomes fissured and permeated with water; the depth of this top fissured portion is very variable; in the Karroo it extends some 80 to 90 feet from the surface, in Rhodesia and Bechuanaland down to 300 feet. Where the rock is fissured it forms, as it were, a reservoir holding up the drainage from the surface, and wells and bore-holes put down in this zone cause this water to ooze out and thus become available for pumping. On the sides of hills this water oozes out as springs. This is the main source of our water supply. Deep seated fissures in which water flows do occur but in this country there are practically no porous rocks such as we have in Australia, Europe and America, which form large underground reservoirs, not only for water but for oil, and hence it is hopeless to put down bore-holes in South Africa for the sake of tapping supplies. Occasionally in country traversed by dykes of dolerite it is possible to find places where we can put down deep bore-holes with good chances of success, because the underground fissures are cut off at the dyke and the deep-seated water must flow along the course of the dykes. Many splendid supplies have been tapped in this way in Cape Colony, but even with so many surface indications to guide one, the attempt is not always crowned with success. Faults again act very often in the same way as dykes, but the course of water along them is even more erratic than along dykes.

With regard to dams, the question of retaining walls and bottom come within our scope, and the stability of the dam is naturally largely dependent on geological conditions. Without going into the larger questions, I may in this place point out the role which sand and clay play in making the dam bottom impervious. Naturally sand is much less porous than clay, owing to the fact that the fine particles of the latter are much more easily flocculated, that is to say, form themselves into distended crumbs or kernels due to the surface tension of the films of incisture about them. With a clay bottom then it is necessary to destroy this flocculated structure by puddling; on a sand bottom, however, the fine particles tend to sink down in between the larger grains

and choke up the interspaces. On the sour soils on the Table Mountain sandstone and on the Molteno sandstones under the Drakensberg these fine particles accumulate and form a sort of hard pan; locally this is known as "pot-clay," but if one attempts to puddle it and burn it into bricks the particles simply fall apart.

The drainage of soil is another important branch of our subject. At Home we have seen that the fine waste particles become washed into the subsoil, which is thereby rendered raw. Here we have practically no subsoil, but instead we have deposits of minerals from solution during our droughts; this causes hard-pans. The most soluble substances in weak organic acids, such as are secreted by plant roots, are the iron salts, and hence where there is defective drainage these salts tend to be deposited when the water carrying them dries up. As a consequence the soil becomes cemented with iron. This iron-cemented soil is often called laterite, but it has not sufficient aluminium in it in South Africa to be correctly so termed; it is well known at Home as moor bedstone, ortstein, or, as we call it in South Africa, "ou klip." When the surface soil is washed off it forms cindery masses of ironstone gravel, often looking as if it had been burnt. This is a very deleterious ingredient in the soil; it forms an impervious layer which must be got rid of at all costs; the American method is to blow holes through it with dynamite, and subsequent cultivation will restore proper drainage, so that the "ou klip" gradually dissolves. The mischief done by this "ou klip" is that the repair of waste in the soil by supply from the rock below is cut off, and the soil becomes exhausted of necessary plant foods. A good instance of this is the soil in George and Knysna, in Cape Colony, where part of the coastal shelf is composed of Table Mountain sandstone—a pure quartz sand rock with scarcely any plant food, and part of granite consisting of all the necessary foods. A similar rock couple occurs also by Port Shepstone and in the north of Natal. In Knysna the ou klip has formed and the soil on the granite is precisely similar to that on the Table Mountain sandstone; it is distinctly sour but rich in humus and nitrogenous compounds and admirably adapted for wheat-growing if there was a small proportion of lime, potash and phosphorus to help; these constituents, however, have long been exhausted from the soil, and as no fresh supplies can be obtained from the granite below, owing to the impervious ou klip layer, the veld is simply sour grazing land. Where the land has been drained and the ou klip removed, as it has been in one solitary instance, the soil is found to be equal to the best we have in South Africa.

Hard pans form also from silica dissolved and deposited, and sometimes also from lime. This latter I have not seen in Cape Colony, but in India it forms the kankar, a solid impervious sheet of limestone underlying the soil. I understand it does form in Natal, but only in isolated nodules; still its formation shows the aeration and drainage of the soil

is defective, and where it occurs it indicates that the lime that ought to be circulating in the soil, neutralising the organic acids and helping bacterial growth, is being abstracted and precipitated. The hard pans due to rise of alkali do not trouble us much on the south-east; in the west of South Africa they cause considerable damage and have made many irrigation schemes abortive, as, for instance, the Van Wyk's Vlei Scheme. The cure for this is subsoil drainage—an expensive expedient, but carried out in Oudtshoorn with beneficial effects; mulching or loosening of the surface so as to prevent rise of subsoil water; and the growing of alkali-resisting crops such as lucerne and Australian salt-bush. The Egyptian method of leaching is impracticable in this country. Common salt does not trouble us as, owing to the fact that solutions of it pass so readily through the soil, it is easily drained away, but sodium carbonate and sodium sulphate do cause difficulties. The former, known as black alkali, is easily converted into the latter, or white alkali, by the application of gypsum.

An artificial hard pan often forms where, owing to the fear, imported from Europe, of stirring up subsoil, ploughing is carried on year after year to exactly the same depth. The surface is flocculated normally, but the fine waste particles accumulate under the tilth and choke up the interspaces, just as happens on some of our sour soils naturally. This is known as the plough sole, and is exceedingly difficult to get rid of; it is practically impervious and insoluble, cutting off all renewal or waste from below and forcing surface water to stagnate above it, while if ploughed into the normal tilth it does sterilize it in the manner feared by the farmer in the beginning.

The question of drainage has another effect in the amount of heat retained in the soil during the night. Generally on sandy soils the surface becomes rapidly cooled at night because there is very little pore space and therefore scanty reservoirs of warmest vapours; in clay soils, however, the pore space is larger, and warm vapours produced during the day are jealously retained. This fact is strikingly illustrated in the Molteno sandstone where it is traversed by dolerite dykes; the sandstone yields a sandy soil, the dolerite a rich red clay soil, and one will notice that the Kafirs always build their huts on the dolerite simply because the soil is warm at night. In this case the ferric hydrate in the dolerite soil adds to the effect as it is strongly absorbent of gases by itself. The practical application of this in elevated positions where tender plants are cultivated is obvious, as hoar-frost will not fall on the ferruginous clay soils while it may lay thick on the neighbouring sandy soils.

I have treated rocks hitherto as soil producers, but rocks are occasionally so rich in certain essential plant foods that they are mined as manures. They fall naturally under the heads of lime, sulphur, potash, phosphorus and nitrate manures.

Lime occurs in our rocks in immense quantities either as pure limestone, as in the Pal-afric beds of the Lower Umzinkulu, or in nodules or segregations in the Karroo rocks behind the coast-belt. Lime combined with silica occurs in the felspars of some of the granites and always in the dolerites intrusive in the Karroo rocks and in the basalts of the Drakensberg. In the latter cases the soil is often sour above the rocks, but the lime is there, and one can by proper drainage and cultivation of bacterial growth render it available for the plants. Along the coast there is from Port Shepstone to the Durban Bluff a belt of consolidated sands for the greater part calcareous; they are easily soluble, and the iron left behind after solution colours the sand a bright red. These rocks have not been studied, but my impression is that they are the same as the consolidated sand-dunes of the Cape Colony; they are far younger than the Cretaceous rocks of Pondoland. At any rate they are calcareous sands, unlike European sea sands, which are quartz sands, and they have been formed by sea shells washed up by the tide and broken into fragments small enough to be carried by the wind. They form an immense reservoir of lime in a form which can be easily used for manurial purposes. Along the coast the wind does the transporting, and wherever these sands are carried, even on to bitter sour veld, the soil becomes sweet and productive. Being composed of broken shells, the lime also contains an appreciable percentage of phosphates, which is further beneficial.

Sulphur as a plant food occurs in the rocks in the form of iron pyrites, a mineral which occurs very largely in small crystals throughout most of the sedimentary rocks. Although it is yellow when in grains or crystals, when in thin films it is blue, and to this mineral the blue colour of most undecomposed sedimentary rocks is due. In Cape Colony it occurs largely combined with lime as gypsum in the lower Cretaceous rocks which we know as the Uitenhage series, but which do not reach into Natal; it is this ingredient which makes the soils of Uitenhage, Oudtshoorn and Robertson so specially productive. It seldom occurs in quantities which can be dug out, but occasionally it can be gathered in the form of swallow-tail crystals from the conglomerate at the base of the series. In the Colony above the boulder clay or Dwyka conglomerate there is a band highly charged with carbonaceous matter and pyrites. The boulder clay contains much lime, and a surface interchange goes on whereby the lime unites with the sulphur of the pyrites to form gypsum, and the iron of the pyrites oxidises to red or kafir ochre. We have the boulder clay in Natal and the ochreous shales above, but I do not know whether there is gypsum here as well. At the best, however, the deposit is superficial, and no great quantity exists in Cape Colony anywhere. Gypsum occurs also underlying the salt deposits in the salt pans.

Potash is very largely present in granite soils and soil derived from sedimentary rocks composed of granite waste, both sands and shales.

Soils retains potash solutions while it lets soda solutions pass freely through, and the action of potash is to promote solution of the inorganic substances. Potash is present in sea water, and hence it occurs in the deposits formed when an arm of the sea is cut off and the water evaporated. Luckily for agriculturists, at the time when our Karroo rocks were being laid down under water an immense inland sea became land-locked where Europe now lies, and by some peculiarity in the conditions, as the sea water became more and more concentrated, the various ingredients in solution separated out and became deposited independently; thus in one layer sulphates were laid down, in another common salt, but in still others, pure potash salts. These deposits were buried and now underlie Northern Europe; they have been tapped at Stassfurt and neighbouring places, and yield enough potash to supply the whole world for centuries to come. These Stassfurt deposits allow the potash salts to be won so easily and cheaply that it is needless for us to seek a South African supply, while, at best, the amount of potash needed in a soil is very small.

Phosphorus occurs as organic deposits in guano and in bones. In rocks it occurs in large quantities in fossilised droppings of extinct animals which are dug out, as in the Cambridgeshire greensand, and ground down for manure. Some of the largest deposits, however, occur in the South Sea Islands, for instance, Christmas Island, where they exist as fossilised guano beds, and are exploited on a large scale. The cheapest form of phosphate manure is basic slag, an artificial product; yet the story of how the phosphorus got into the original iron ore is purely a geological question. No natural masses of phosphate-yielding rocks occur in South Africa, but such have been worked for many years now in the Cretaceous rocks of North Africa.

Nitrates and nitrogenous compounds are either the product of direct combination of atmospheric nitrogen by means of the electrical discharge during thunderstorms, or of organic activity. In this country nitrogenous compounds exist in sufficient quantities in our soils for all purposes of plant growth, and are produced either by one or other of the above causes or by both. The application of nitrates is usually superfluous, and the use of guano, saltpetre and other nitrogenous manures is mainly beneficial from the fact that these are combined with other plant foods. Naturally nitrate occurs in great bulk in South America as a surface deposit. The mineral is found on a raised beach where guano and sea animals, shell fish and so forth had accumulated; these decaying yielded the potash nitrate, but the salt deposited along with them converted the nitrate into a soda nitrate which is practically useless. The discovery of vast deposits of potash at Stassfurt, however, came to the rescue of agriculturists and others whose life depends on blowing up their fellow creatures, and chemists were enabled to reconvert the Chili saltpetre into the proper potash nitrate. In South Africa nitrates occur under

krantzes and in caves where large accumulations of droppings of bats, rock rabbits and other cave-dwellers exist. A great many syndicates have been formed to exploit these small deposits, dazzled with the wealth that accrued from the working of the Chili saltpetre—one I know appealed for subscriptions to the extent of half a million, while the total amount of saltpetre in the farm under prospect would not fill a mealie sack. The source of nitrates now is, or will shortly be, purely artificial, as there are large factories established in Europe for converting atmospheric nitrogen into compounds by the aid of the electrical discharge, so that the nitrate hunters will have no excuse for troubling us in future.

In the foregoing remarks I have outlined briefly what is agricultural geology, and I have touched on subjects which the geologist in his work has to notice and record. If our agriculture is to become more than a mere haphazard affair these facts must be understood and advantage taken of them. I do not mean that every farmer will have to become an expert geologist, but I do insist that geological data ought to be available to him to work on. I have had naturally to speak only in general terms, as I am not personally acquainted with Natal geology, which bristles with problems of a complex character, but if I have shown that my science is not a theoretical amusement, but has a practical bearing on everyday life, I shall be quite satisfied, and I dare hope that when the finances of the country become somewhat easier, this use will be recognised and a geological survey will be re-started.

His Excellency the Governor of the Transvaal has been pleased to appoint Mr. Charles Walter Howard as Entomologist of the Transvaal Department of Agriculture, with effect from the 1st July, 1907.

THE HISTORY OF THE COWPEA.—In order to clear up many questions with the history of the cowpea and its introduction into America, a botanist trained in the critical discrimination of plants and with a wide knowledge of botanical literature, went into the matter under the auspices of the Bureau of Plant Industry of the U.S. Department of Agriculture. Mr. W. F. Wight has made a thorough investigation of the history of the cowpea; and in a bulletin prepared by him he brings forward proofs of the principal points of that history, namely, that the cowpea is a native of the Afghanistan region; that it was introduced into the West Indies over two hundred years ago; and that it was subsequently brought to the American mainland, gradually extending northward until, about 1797, it reached the latitude of the Potomac and attracted the attention of such a keen agriculturist as Washington himself.

Parliamentary Notes and Notions.

By "SCRUTATOR."

Maritzburg,

17th August, 1907.

THE even monotony of the proceedings in Parliament since last month's "Notes" has been unbroken by any discussion or incident of very great concern to the farmer. The Treasurer read his Budget Speech, the first from Mr. Brunner,—a lucid exposition of the present state of the Colony's trade and the general financial position; Parliament has since then been mainly occupied with the Estimates; and in addition various of the Bills outlined in last month's "Notes" have engaged some portion of the attention of members. There have, in addition, been lengthy discussions on such important subjects as Zululand land titles, and the Indian question.

The Budget Speech.

A perusal of the Budget Speech leaves the impression that Natal is not in such an unenviable position as pessimists are too fond of telling us. Our Customs statistics show a condition of things that, in spite of the present severe depression, promises well for our chances of a prosperous state in the comparatively near future; they show, at any rate, that Natal has undoubted potentialities and is not the resourceless country that some people would have us believe. During 1906 there was a heavy decrease in our imports, whilst there was a marked increase in our exports of South African produce. Imported goods were very largely displaced by similar articles of local production; and this is, as the Treasurer pointed out, indeed a satisfactory feature, as it shows that the Colony is making progress in the production and manufacture of goods for her own as well as her neighbours' use. Some of the main decreases were in ale and beer, biscuits, fresh and frozen meat, soap, sugar, and wood manufactures—goods which are now to a large extent produced locally.

Natal's Trade in 1906.

Our imports during 1906, from all sources, reached a total value of £11,131,000, a decrease of 10·2 per cent. compared with the previous year. Goods of United Kingdom origin, which in 1904 represented 58·8 per cent. of the total merchandise imported and in 1905 had fallen to 55·2 per cent., were further set back last year to 52·2 per cent.. The

proportion of our imports from foreign countries increased from 24·7 per cent to 30·3 per cent. during the same period. Our total exports amounted in 1906 to £9,601,000 (exclusive of specie), a decrease of £629,000, equal to 6·1 per cent. This was not, however, a real set-back, as the decrease was confined to imported goods re-exported, a decrease that was natural in view of the decrease in our imports during that year. The following statement will show the direction and proportion of our exports in 1906-7 as compared with 1905-6:—

<i>Imported Goods Re-exported:—</i>		1906-7.	1905-6.
		£	£
Oversea		376,078	268,972
Overland		4,863,542	5,802,508
<i>South African Produce:—</i>			
Oversea		1,755,497	1,614,512
Overland		1,205,645	1,142,866
Raw Gold		1,183,129	1,109,644
Total Exports		<u>£9,383,891</u>	<u>9,938,502</u>

The Treasurer points out that the outstanding feature of the Colony's trade is the "steady and rapid growth in the export trade in articles of South African produce or manufacture." Since 1903 there has been an advance of 76·1 per cent. in our exports of South African produce: in that year our total exports of South African produce were of the value of £1,530,000 only, whilst in 1906 the figures had risen to £2,695,000. The following statement shows the principal articles contributing to this increase:—

VALUE OF SOUTH AFRICAN PRODUCE EXPORTED.

	1906	1903
	£	£
Bark	89,000	71,000
Coal	552,000	312,000
Fruit	127,000	75,000
Hair	55,000	31,000
Hides and skins	76,000	23,000
Jams and jellies	14,000	6,000
Maize and maize meal	182,000	46,000
Matches	74,000	12,000
Sugar	403,000	324,000
Wool	537,000	292,000
Other products	586,000	338,000
	<u>£2,695,000</u>	<u>£1,530,000</u>

Guided by these figures, says the Treasurer, it is reasonable to conclude that, although the past three years have witnessed a severe falling off in revenue through the Customs, and have placed a severe strain upon many commercial firms, the aggregate wealth of the community has not suffered greatly. "A moderate proportion only of the total value of imported goods represents actual profits within the Colony, and these profits accrue to importers and dealers; whereas in the case of South African produce or manufactures exported, a much greater proportion of the value benefits either the grower, or manufacturer, the person whose labour is utilised in its production, or the agent employed in its transit to the port of shipment. Clearly, then, efforts should be made to further develop existing industries, and to initiate any others offering reasonable hope of success."

In this connection, the opportunity may be taken to remind readers of the Treasurer's explanation of the reason for increased taxation—or, to speak more accurately, for altering the incidence of taxation. The fresh taxation proposals brought forward by Government at first sight have a depressing effect (in more than one sense, perhaps!), in that they seem to point to a greater degree of distress in the trade and general economic position of the country than is really the case. After pointing out the evidence contained in the Customs statistics of the Colony's rapidly increasing ability to supply produce and manufactures for its own consumption, and the consequent fact that we shall, year by year, require to import a smaller quantity of goods from beyond our borders, Mr. Brunner remarks that these imports form one of the principal sources of revenue, and that, therefore, the gratifying increase of the Colony's products has brought about the inevitable decrease in the amount derived from Customs duties. "The expenses of the administration of Government must, however," he says, "be provided for, and as the taxes imposed through the Customs can no longer be relied upon to yield a sufficiently large sum, it becomes necessary to alter the incidence of taxation, and to obtain from other sources revenue for the requirements of the Treasury."

Agricultural Bills.

Fair progress has been made with the Bills which have been introduced into the Assembly. With certain amendments, the East Coast Fever Fencing Bill, the Tuberculosis Prevention Act Amendment Bill, and the East Coast Fever Loan Act Amendment Bill, have passed through both Houses. The East Coast Fever Act Amendment Bill has been read a third time by the Assembly; and a further Bill ("to prohibit the export of ostriches and ostrich eggs") has been introduced and read a first time.

On the motion of the Minister of Agriculture for the third reading of the East Coast Fever Amendment Bill, Mr. Hyslop asked that some explanation be given by the Minister as to what exactly were the powers conferred by the Bill. He thought this explanation was desirable because there was great ignorance on the part of people in the country as to what had been done in the matter. The farmers would probably not understand that compulsory slaughter had been resolved upon, nor what steps would be taken under the powers conferred by the Act. He was sure, however, that, when farmers did know, they would be very satisfied with the course decided upon. He also asked the Minister to explain how the necessary funds were to be provided.

In reply, Mr. Deane said that, after the Bill had been passed by Parliament, and power for compulsory stamping-out was thereby given to the Government, the first step taken would be to call the people together in the districts affected by East Coast Fever and explain the provisions of the new law, especially with regard to the natives. Full explanation would be made; and it would be pointed out to the farmers and the natives that the powers conferred upon the Government did not necessarily mean the wholesale wiping out of cattle.

In the removal of cattle the following process would be adopted. Where one or two days' trek from the farm to the nearest railway station was necessary, the animals would be temperatured before removal, and every day whilst on trek. All cattle with a normal temperature would be moved on, those with abnormal temperature would be slaughtered on the spot. If this process were carefully and thoroughly done there was no danger of their spreading the disease, even when passing through clean ground. The Government, Mr. Deane said, would be as fair as possible with regard to the schedule of prices. As regards the natives, it was well known how averse they were to having their cattle taken away, but, on the other hand, where the disease was rampant natives were now clamouring to have their cattle taken by the Government.

As to the cost involved in the proposed policy of stamping out, Mr. Deane considered that it would take £100,000 to deal with the disease on the lines suggested. The loss would be about 30 per cent. The cattle to be slaughtered, he continued, would be brought to the Government Abattoir and dealt with there, and arrangements would be made to sell the meat. No one but the Government would be allowed to remove cattle; and the Government would sell the meat and dispose of the hides and horns to the best advantage. With regard to the funds necessary, Mr. Deane reminded members that a Bill had been introduced last Session to provide for the raising of £200,000 for stamping out purposes. The

House did not, however, approve of the policy of stamping out, and the Bill was reduced by half. Mr. Deane anticipated that a Bill providing £100,000 for the purposes of the measure under consideration, would be introduced during the present Session.

Export of Ostriches.

A Bill "to prohibit the export of ostriches and ostrich eggs" has been introduced by Government and read a first time. The prohibition proposed will be unconditional except in the case of ostriches or ostrich eggs intended for export to any neighbouring Colony or State where similar legislation exists. The object of this Bill appears to be to bring Natal into line with the other South African States, some of which have passed Acts on the same lines. The effect of this legislation will be protective of the ostrich farming industry in South Africa; but the advantages directly derived by Natal will not be as great as in the case of Cape Colony, for instance, as ostrich farming in Natal occupies the attention of a very small number of our farmers.

Indian Question.

The Labour Party seems determined to leave no stone unturned to make it impossible—or even, if they can bring it about, unlawful—for trading on the part of Indians (including the class known as "Arabs"—who are, it may be mentioned, not Arabs at all, but Indians, they being Mohammedans, and so of a superior caste to that of the ordinary Indian, designated indiscriminately as "coolies"). Mr. Haggar was obliged to withdraw his Bill; and, having done so, moved two resolutions: first, "that, in the opinion of this House, the time has arrived when the Government should take steps to effectively restrict and ultimately to abolish Asiatic immigration into Natal;" and second, "that all Indians or other Asiatics who may arrive hereafter in Natal, under indentures made after December 31st, 1907, shall, on the expiration of such indentures, be repatriated."

Mr. Johnstone thereupon moved the following amendments: (1) "That, in the opinion of this House, it is desirable that, during the recess, the Government should enter into negotiations with the Government of India, through the Right Hon. the Secretary of State for the Colonies, for the purpose of making alterations with regard to Indian immigration, whereby immigrants should be repatriated at the expiration of their term of service;" and (2) "That the Government should also take into consideration the amendment of various laws affecting Indians at present in the Colony, with the view of encouraging the employment of such in the labour market, thus decreasing and making less necessary the importation of Indians." He pointed out the fact—a fact that appears to have

quite escaped the notice of blind advocates of Indian repatriation—that the Indians were originally introduced into the country for the development of two of our greatest agricultural industries—the tea and sugar industries. He rightly contended that, if the importation of Asiatic labour were stopped, those industries would be instantly strangled.

The source of the whole difficulty lies, not in the fact that we are using indentured Indian labour, but in the fact that, when the Indian's term of indenture expires, we cannot force him to return to his country. Then the newly liberated Indian casts around for the most profitable occupation. Whatever he goes in for, he has one great advantage over the European: he can live on next to nothing, and he can live in the most squalid surroundings, so long as the rent does not make too large a hole in his income. Consequently he can undersell the European, and, not having, also, any of the expenses and losses that the European trader has to face, he can, at the same time, make a large profit. We must, for some years yet, import the labour we require for our sugar and tea plantations—until the conditions prevailing in the native labour market change—but at the same time the growing evil of Indian trading is calling for remedy. Therein lies the difficulty.

Mr. Johnstone's amendment was seconded by the Treasurer, and, on being put to the vote, was carried by 25 to 9.

A week later Mr. Haggart asked for leave to introduce a Bill to amend Act No. 17, 1895, entitled an "Act to amend the Indian Immigration Law, 1891." His motion was negatived. He then, on the following day, moved: "That, in the opinion of this House, the Government should introduce legislation providing that after a certain date, but not later than 31st December, 1912, it shall be unlawful to grant any licence to persons known as 'Asiatics,' 'Arabs,' or 'Arab Traders' in the Colony of Natal." A long discussion took place; and, finally, the motion, on being put, was lost, on a division, by 28 to 10.

Locust Destruction.

The subject of locusts has not, so far, occupied any part of the attention of members in our House. The Legislative Council of the Orange River Colony has, however, been engaged with the consideration of an important measure which the Government has introduced, framed chiefly on the results of the experience of Natal. The *O.R.C. Government Gazette* of the 9th August contained the promulgation of that Ordinance.

Under the provisions of the new Ordinance, every occupier of a farm on which locusts have deposited their eggs is compelled to give

notice of the fact, in writing, to the nearest police post. The penalty imposed for failure to comply with this section of the law is a fine not exceeding £10, or imprisonment for a period not exceeding one month. It is provided that no occupier of a farm shall be exempt from the penalty imposed by reason of mere temporary absence from the farm at a time when such eggs were deposited.

Occupiers are also compelled to give immediate notification of the appearance on their land of any *voetgang*ers (whether hatched thereon or otherwise), and must further use their "utmost endeavours" to destroy such *voetgang*ers. The same penalty as before is imposed in the case of failure to comply with these provisions.

The individual who tries to evade his responsibilities by driving *voetgang*ers from his farm on to his neighbour's land, has not been forgotten. He is not, however, liable to any penalty if, in the case of his growing crops being threatened by a swarm of *voetgang*ers, he drives the locusts on to a neighbouring farm after having in vain attempted to destroy the swarm.

A Chief Locust Officer and subordinate locust officers are to be appointed. These officers will have power to enter on any farm on which *voetgang*ers have appeared and take all such steps as they may deem necessary to destroy such locusts; and whilst carrying out such duty, locust officers are entitled to the free use of any water that may be required for the purposes of destruction, and also to free grazing and water for their animals—transport and otherwise.

In a case where an occupier fails to give the required notice of the appearance of *voetgang*ers or to use his utmost endeavours to destroy such locusts, the cost of destruction by Government will be recoverable from the occupier; whilst in the case of a farm where there is no white person resident as occupier, or where the occupier is the manager, caretaker, or otherwise the servant of the owner, and has failed to give notice of the appearance of *voetgang*ers, and has not used his best efforts to destroy them, the expenses incurred by the Government are recoverable from the owner himself.

In the same issue of the *Gazette* as that in which the Locust Destruction Ordinance is promulgated, appears notification of the re-appointment of Mr. Charles McG Johnston as Chief Locust Officer of the Orange River Colony for a further period of six months, from the 1st July, 1907.

Export of Mealies.

AN IMPORTANT MEETING.

QUESTION OF GRADING.

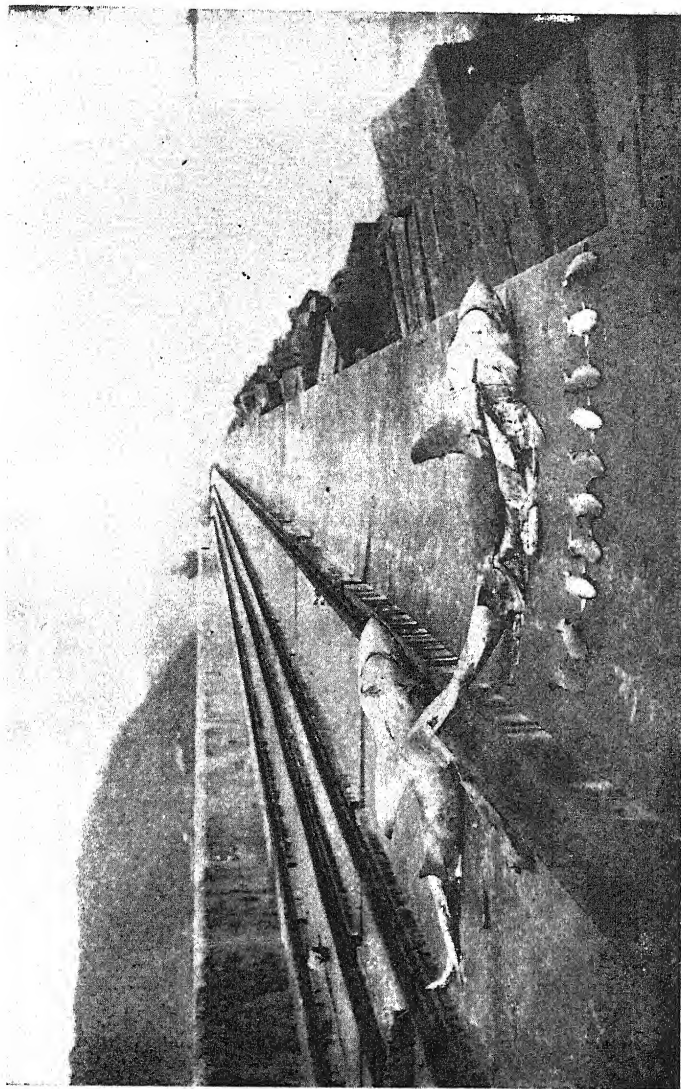
SATURDAY, August 3rd, was the occasion of an important meeting of persons interested in the export of mealies, in the office of the Prime Minister, called on the initiative of the Minister of Agriculture for the purpose of obtaining advice in connection with the proposed organised exportation of mealies. Representing the farming interest were Messrs. G. D. Alexander, J.P., and the Hon. T. Hyslop (representing the Mealie Growers' Union), J. A. Westbank and H. A. Light (representing Dalton Farmers' Association), J. Moon, J.P., and Baker (representing Camperdown Association), W. Pepworth (Klip River), Oldacre (Newcastle), and Lund. Messrs. Henderson (Chairman of the Durban Chamber of Commerce), A. G. May, De Waal Balwe and Hayne appeared on behalf of the mercantile industry; while the Government was represented by the Prime Minister, the Minister of Agriculture, and the Secretary to the Minister of Agriculture.

In opening the proceedings the Minister of Agriculture said the time was fast approaching when the work of exporting mealies should be undertaken. He took it for granted that they all knew what the Government had already done in connection with the organisation of an export of mealies. The first step would have to be the appointment of an inspector at the Port. Circular letters had been sent to the various farmers' associations of the Colony, and as a result about a dozen samples of mealies had been received. He now wished to have the advice of those present regarding those samples, which were before them: he wished to know whether mealies should be sent in one grade or in more than one. When that point had been settled the Government could go ahead and appoint their inspector.

The Prime Minister next spoke. He said the Government wanted the co-operation and assistance of both the merchants and the farmers. The Government had moved in the matter up to a certain stage, and it now felt that, without the co-operation of both the farmers and the mercantile community, any further advance on the part of the Government would be more or less futile. The Government hoped and believed that the merchants would give their assistance in dealing with the grain in Natal and on the London markets through the agencies and ramifications of their business connections. The farmers, in their turn, would be able to help them in respect of the production of the grain; and the

Government could do its part in seeing that the quality of the grain was up to sample. He understood that in the London market the grain was generally dealt with on samples. He had had forwarded to him, from one of the largest brokers, a sample showing the way in which grain was dealt with on the London market, and the utmost importance was attached to the bulk being true to the sample. He was informed that it was not of much consequence to the dealers whether good, bad or indifferent grain was sent so long as it was true to the sample—so long as the broker could say, "That is a sample representing so many bushels." There was a market for all kinds and descriptions of grain in London. He had advised that the brokers had their grain standardised from different parts of the world, and that these standards were recognised in the trade as representing grades number one, two and three, or whatever other classification might be adopted. It was of the utmost consequence that in developing what was one of the most promising export trades in South Africa their *bona-fides* should be unimpugned and above suspicion. It was in this respect that the Government could be of assistance if those present would formulate the conditions under which the grain should be exported. The Government had a large building at the port which might be used for the purposes of the export trade.

Mr. G. D. Alexander asked what were the Government's intentions with regard to the export of mealies. When it was first suggested that the Government should take part in the arrangements for the export of the grain, it seemed to him apparent that to do anything of the sort was entirely outside the Government's functions. He considered that it was a matter which should be undertaken by the farmers themselves: all that the Government should do should be to make the road for that export easy. With that view, and as a result of a resolution passed by the Natal Agricultural Union, an attempt had been made to establish a Mealie Growers' Union. From what the Minister of Agriculture said at the recent Conference, he understood that the Government was in sympathy with this movement, and was desirous that the farmers should take it up. The Mealie Growers' Union then sent circulars and copies of rules that had been drawn up all over the country. Very shortly afterwards the Minister of Agriculture called for samples of mealies, which action at once raised in the farmers' minds the question as to whether these mealies were to be exported through the Mealie Growers' Union or by the Government. Apparently on account of the fact that the Government was calling for the samples, farmers concluded that it was the Government which was going to do it. The consequence was that, from all the circular letters and copies of rules that were sent out, only two replies were received; and although there was a large number of enquiries, the farmers were hanging back, anxious to know if the Government was going to carry out the export and save them the £1 subscription



A LARGE HAUL OF SHARKS.

The above illustration represents a portion of a large catch made by Mr. J. J. Stephenson, of the Department of Agriculture. Two female sharks, each 7 ft. 6 in. long, were caught. In one of these were found ten young ones—shown in the foreground of the picture; in the other were seven young ones, so that nineteen sharks may be said to have been caught with two throws.

and the commission which would be charged by the Union. Before anything further was done, he would like to know, whether it was the intention of the Government to take up the export of mealies and act in the way the Mealie Growers' Union was going to act. The Government had made it impossible for the Mealie Growers' Union to go on.

The Prime Minister said that the Government had already made the road easy for the mealie growers. It had reduced the freight by nearly 50 per cent, and was offering all the information within its power. The samples received were indicative of what the farmers had done in response to the action of the Government. The presence of those gentlemen that day was an answer to Mr. Alexander. The Government was prepared to render help in whatever way it could. That was the very object they had in view in starting the movement, and he trusted the Government would have the co-operation of the farmers. Whatever had been done so far, had been done on the initiative of the Government. He himself did not know whether the crop this season was sufficiently large to admit of an export being undertaken. That point did not concern him much; but what did concern him was that, if they could send away grain and prove that it was possible to export it, they would have taken a step in the right direction, which would mean that in a few years they would have large quantities of stuff to send away.

The Colony, continued Mr. Moor, was capable of producing far more than it was doing at the present time, and it would produce more provided the farmers knew there was a market over the water. The first step was to prove that mealies could be produced at a price that would admit of a satisfactory overseas export; and, having proved that, they could then say to the people of South Africa, "Here is practically a limitless market for you," even although the present year's shipment was confined to a few thousand bags.

The Minister of Agriculture contended that the Government was clearing the way for the mealie growers, and not standing in their way. In estimating the production of mealies in the past, he had only taken account of the European crops. Applications, however, had been received from natives in the Thorn country asking for assistance to get their mealies to market. There had been an exceptionally favourable season in the Thorns, with the result that the native crops were far above the average.

Mr. Alexander explained that he had no wish to decry what the Government had done; but he wished to know clearly the Government's intentions regarding the future. He had stated again and again that the facilities given by the present Government for the export of mealies had done more in the interests of agriculture than all the experiment farms and agricultural settlements that had ever been brought into existence. In order, however, to carry out mealie exportation properly, it should be done by the farmers themselves through their Union. He

repeated that the action of the Government in calling for samples had done a great deal of harm to the Mealie Growers' Union. He declared that he intended to resign his position as acting chairman of that Union because he felt it impossible to go on with the present arrangement, when the Government was to export the mealies and not the Mealie Growers' Union. As far as the question of mealies going out of the country was concerned, the Union undertook to deal with the crop not as an export crop, but in any way in which it could be sold to the best advantage, whether in the Transvaal or elsewhere. The action of the Government in lowering the rates and giving greater facilities was worthy of the greatest praise; but its action in stepping in now while the Union was in operation and existence virtually prevented the continuation of the Union. This was a great mistake.

Mr. W. Pepworth returned thanks to the Government for its action in the interests of mealie growers, and he expressed the opinion that, in doing so, he was voicing the views of the farmers in the Klip River Division. He suggested that the Government should provide facilities for storing the mealies at the port, and that it should aim at treating the mealies like coal, delivering them wholesale into the trucks and then into the ships, bagging them in London.

Mr. Moon regretted the attitude that Mr. Alexander had taken up.

Mr. Henderson said the Durban Chamber of Commerce were in sympathy with the endeavour to create an export trade in mealies.

Mr. May had no doubt that Natal could compete successfully with other countries, but he did not think that the mealies submitted that day were a fair average of the present year's crops. They were too good. He did not think it would be possible to fix any grades from the samples before them. It was better to follow the lines of other countries and have a large number of other grades, which would not necessarily complicate matters. Mr. May then explained some of the methods of grading adopted on the American markets. Whoever was going to do the sampling, he said, would have a hard task. He knew from experience even careful farmers would send different grade mealies in the same truck. He knew of no country exporting mealies which did not bulk them before or after export in order to grade them more satisfactorily. He asked whether the Government had taken into its consideration the question of weighing mealies in order that an official certificate might be given of the grade and weight, so that the farmer could be relieved from all responsibility as soon as the mealies were put on board.

The Prime Minister said that the Government was willing to do this; and he suggested that the meeting should appoint a sub-committee to go carefully into the matter of grading.

A sub-committee, as suggested, was appointed at the conclusion of the meeting, consisting of Messrs. Hayne, Light and May (representing the commercial community), and Messrs. J. G. Colenbrander, J. Moon

and W. Pepworth (representing the farmers). A meeting to decide the matter of grading was arranged to be held in Durban on the following Thursday.

A discussion arose regarding the quality of the bags used for exportation purposes, and it was contended by the representatives of the commercial community that the bags should be at least $2\frac{1}{2}$ lbs. in weight. Mr. May said there was a law in force in Australia prohibiting the importation of bags under $2\frac{3}{4}$ lbs., unless the weight was distinctly marked thereon.

It was pointed out that the farmers had already bought their sacks for this season, the majority of which weighed $2\frac{1}{4}$ lbs., and therefore there was likely to be a big loss from leakages.

The question of the temporary storage of the mealies at one of the sheds at the port was discussed. It was pointed out that it would not be practicable to set apart a separate shed for the mealies, because of the uncertainty of where the ships would berth.

The Prime Minister said he would take into consideration the matter of arranging for vessels shipping mealies to berth opposite the shed where the mealies were stored, and thus save a double handling.

The Minister of Agriculture said that a charge of about one farthing a bag would have to be made to cover the cost of inspection and weighing at the port.

The following is a copy of a circular letter which has been sent by the Minister of Agriculture to the various Agricultural Associations of the Colony, regarding the matter of the grading of mealies for export oversea:—

“Department of Agriculture, Pietermaritzburg,

20th August, 1907.

“Sir,—I have the honour to inform you that a meeting was held on the 3rd of August, which had been convened by the Government for the purpose of discussing the question of mealie export, and that, at the meeting in question, a sub-committee was appointed for the purpose of deciding upon the grades under which Natal mealies should be exported oversea.

“This committee has made the following recommendations regarding grading, which have been adopted by the Government:—

No. 1. White Flat Mealies.—Shall be sound, dry, plump, well-cleaned, and the grain nearly even in size. Occasional straw-coloured spots on the grain shall not deprive it of its grade.

No. 2. White Mealies (Flat Variety).—Shall be sound, dry, and reasonably clean, but an occasional yellow or discoloured berry shall not deprive it of its grade.

No. 3. White Mealies (Flat Variety).—Shall be dry. Berries may

be of irregular size and shape, and a reasonable quantity, not exceeding 12½ per cent., may be yellow or discoloured berries.

No. 1. White Coast Mealies.—Shall be bright, dry, sound, and well-cleaned. May be round, or round and flat mixed. An occasional coloured berry shall not deprive it of its grade.

No. 2. Mixed Mealies.—Shall be dry, sound, and reasonably clean. May be round, or a mixture of round and flat. Chiefly white, but may contain up to 25 per cent. of yellow or blue berries.

No. 3. Mixed Mealies.—Shall be dry. May be round, flat, or a mixture of both; chiefly yellow and white. A reasonable percentage of blue berries allowed.

No. 1. Yellow Flat Mealies.—Shall be bright, sound, dry, plump, and well-cleaned.

No. 2. Yellow Flat Mealies.—Shall be sound, dry, reasonably clean. An occasional white, red or faulty berry shall not deprive it of its grade.

No. 1. Yellow Round Mealies.—Shall be bright, sound, dry, plump, and well-cleaned.

No. 2. Yellow Round Mealies.—Shall be sound, dry, and reasonably clean. An occasional white, red or faulty berry shall not deprive it of its grade.

No. 3. Mixed Yellow Mealies.—Shall be dry, may be round, flat or a mixture of both.

“Should you wish to export mealies and to avail yourself of the grading system under which the mealies are to be sold to arrive on samples previously sent Home to England, it will be necessary for you to notify me of the quantity you intend to export and of the probable date of the arrival of the consignment in Durban.

“The mealies must be graded in Durban from an inspection of the consignment by Mr. J. A. Westbrook, who has been appointed by the Government; and you will be notified as soon as possible of the grade under which they have been so classified by the Government Inspector. The bills of lading will be duly endorsed with the grade, and arrangements will also be made for the mealies to be weighed, and the weight of the consignment endorsed on the shipping documents. A small charge will be made for the inspection and the weighing. Arrangements must be made by the shippers themselves for the insurance of the consignment.

“The mealies can, if required, be consigned to the Agent-General in London, who will sell them to the best advantage, and the money so realised will be cabled out to Natal by the Natal Bank free of expense to the consignor.

“The samples of the various grades are being forwarded to the Agent-General in London, and it is intended to cable to the Agent-General as each shipment leaves the Port notifying him of the numbers of the bags and grades so that the consignments can be sold before arrival. If this course be not followed the mealies will have to take their chance on ar-

rival in London, and extra expenses will be incurred in connection with handling and warehousing.

"The following figures represent railway carriage, freight, banking charges, and all other incidental items of expenditure, including commission on sale in the Home market:—

Freight From—	Per Ton.			Per Muid. (200 lbs.)	
	£	s.	d.	s.	d.
Ladysmith to London	1	3	6	2	2
Newcastle to London	1	6	9	2	6
Dundee to London	1	5	6	2	4
Estecourt to London	1	1	8	2	0
Greytown to London	1	1	3	1	11½
Richmond to London	1	0	6	1	10½
Creighton to London	1	2	6	2	1
Dalton to London	1	0	6	1	10½
Maritzburg to London (including cartage)	1	1	2	2	0½
Verulam to London	1	0	6	1	10½
Tugela to London	1	0	6	1	10½
North Shepstone to London	1	0	6	1	10½
Umzinto to London	1	0	6	1	10½

"The prices which have been realised for American and European mealies on the English markets during the last six months average from 21s. 6d. to 26s. 6d. per quarter of 480 lbs., according to the season and to the quality of the grain.

"It should be seen that the full 203 lbs. of mealies are placed in sound bags, which must be well sewn with double twine and made secure. Each bag sent forward for export must be clearly marked with the exporter's private mark.

"As this is the initial stage in the export of Natal mealies, it is imperative that each exporter supplies mealies of uniform quality and of proper weight, otherwise our mealies will obtain a bad name on the Home markets, and the endeavours of the Government to establish the export trade will prove ineffective."

TESTING OF EQUINES FOR TRANSVAAL.—It is notified in the *Government Gazette* that, in connection with the testing with mallein of equines proceeding to the Transvaal, the following charges are to be enforced:—For each animal tested, up to six animals, a charge of 5s. a head, which charge is to include mallein; and for each additional animal above six a charge of 2s. 6d. per head, which charge is to include mallein. It is required that these fees shall be paid in cash before the issue of the necessary certificate is made.

Tabakscultuur in Zuid Afrika.

MET SPECIALE TOEPASSING OP NATAL.

Door E. R. SAWER, Directeur, Proef Stations.

De uitspraak van bevoegde beoordeelaars over Zuid Afrikaansche tabak vertoond op de recente Tentoonstelling in Londen werd verheid als een gunstig aanvangspunt voor de discussie van middelen berekend om het Natalsch gegroeid tabaksblad in een gunstige positie te plaatsen op de plaatselijke en buiten markten. En hieruit blijkt ongetwijfeld dat geen poging achterwege gelaten kan worden als verloren tijd ingehaald en onze nijverheid op gelijke voet met die van de aangrenzende Kolonies gebracht moet worden, wier produkten reeds de gunstige aandacht in de voornaamste centra van gebruik trekken.

Het volgende overzicht, gepubliceerd door het Koloniale kwartaalsche blad *Tobacco*, dient als een nuttige vingervijzing tot de vergelijkelijke vooruitgang in verschillende deelen van Zuid Afrika, en de noodzakelijkheid voor een radikale wijziging van ons eigen stelsel:—

“Tijdens de Tentoonstelling werden monsters van bladeren verkocht en de meening van velen van het publiek was dat de goederen, hetzij sigaretten of tabak, als goed verklaard werden, hoewel heel anders van smaak dan de gewone rook materialen. De sigaren waren niet heelemaal een succes, en het kweken van een geurig blad, dat effen brandt, enigszins geschikt voor het maken van beste sigaren schijnt tamelijk ver in het verschiet te liggen. De sigaretten van Rhodesia, Transvaal en Kaapkolonie waren de beste bewijzen van de gemaakte vordering in de nijverheid in Zuid Afrika, terwijl de vele uitmuntende tabakken voor pijpgebruik van verschillende sterkheid en fijnheid van snede algemeen bewonderd werden.

“Een ommekijk naar de vertooningen ving aan met de Transvaal—de eerste thuisplek van de ‘Beer’ tabak. Hier sloot de verscheidenheid in: sigaretten, tabak—gekerfd, in de rol en in het blad, van den heer Van Erkom, Pretoria en Johannesburg. Deze firma heeft gronden in Magaliesberg en hier is het waar deze welbekende tabaksoorten groeien. Een ander treffend vertooning was die van het Transvaalsche Gouvernement uit Zoutpansberg, dat zijn ‘Lataba’ handelsmerk tabak en sigaren vertoonde. Er waren sigaretten van twee en tabak van vier of vijf soorten. Sigaren en het tabaksblad werden ook vertoond, zoomede smit. Het vennootschap Jack, Bepkt., van Johannesburg vertoonde eenige monsters van hun ‘Crocodile’ handelsmerk, uit Magaliesberg tabak.

Een speciale roem van het vennootschap De Jager & Co., Kerk Straat West, Pretoria, dat een belangwekkend vertooning van goederen had, is dat geen chemicalien of geurgevende middeltjes van welke soort ook aangewend worden, een feit dat ten gunste van vele andere vertoond ook bewezen kon worden. Tabak, opgedraaid en in fantastische fatsoenen geperst, werd vertoond door den heer Victor Roodekloof. De heeren G. Bourdos & Co. leverden goede resultaten uit Turksche zaadsoorten, de sigaretten behalende 5s per 100.

“Omtrent vijf Natalsche firma's hadden vertooningen. De heer W. Starr, van Verulam, vertoonde eenige seroeten die er goed uitzagen. W. Starr fabriceert van tabak door hemzelve gegroeid en bewerkt ook andere tabak. Men kan hem beschouwen als een der meest gevorderde pioniers van de Zuid Afrikaansche nijverheid. De heeren Chetty & Co., van Durban, hadden ook eenige sigaren ten toon. The Tobacco Planters, Bepkt., en de heeren Preerks & Co., hadden ook tabak—in het blad en gekerfd.

“De Oranje Rivier Kolonie nijverheid werd vertegenwoordigd door de firma van de heeren Alexander Wright & Co., van Vrededorp, wier roltabak aangevuld was door gekerfd tabak, fijn, medium en grof gesneden, om alle smaken tevrede te stellen. De heer B. Pretorius, van Welgerust, vertoonde ook wat van de eigenaardige gedraaide tabak, waarin de omslag bestaat uit het heele blad, de grove stengels ingesloten, hetgeen deze Zuid Afrikaansche rol en gedraaide tabak een vreemdsoortig ‘touwachtig’ voorkomen geeft.

“De heer H. W. J. van der Veen, van Oudtshoorn, en de heer John C. Raubenheimer, van Seymour, waren onder de vertooners uit de Kaapkolonie. Eenige sigaretten van Turksche zaad gegroeid in het Paarsch distrikt maakten een goed monster uit. Sommige dezer onder den handelsmerk naam van ‘Aroma’ werden gemaakt door de ‘Court Cigarette and Tobacco Factory,’ van Port Elizabeth, en werden verkocht tegen 6d per pakje van 10, en enkelen werden weggegeven als monsters. De heer van Wijk, van Fairbairn, had een mooie uitstalling. De heer J. H. Voegt, van Seymour, vertoonde pijp tabak in pakjes en losse gekerfde tabak, aantoonende verder hoe goede mengsels gemaakt kunnen worden door het gebruik van verschillende soorten. Het distrikt Ladismith, in de Kaapkolonie, is bekend voor de Kalabas pijpen, waarvan er een mooie uitstalling van den heer H. Boide was.

“De Rhodesische afdeeling triomfeerde met hare ‘Turksche’ sigaretten en een prachtige vertooning van Bright Virginia van de ‘South African Plantations, Ltd.’ De sigaretten van de fabriek Gebroeders Barker, Bulawayo, waren voorbeelden van nette verpakking en zorgvuldige bereiding van geurige en goed brandende tabak. Een goede vertooning van het Turksch-Rhodesische blad werd opgemerkt—van het beste gegroeid door den heer S. Briggs, van Mazoe, Zuid Rhodesia. Ook was er tabak voor sigaren te Melsetter gegroeid, en de heer L. Black, van Salisbury, werd ook vertegenwoordigd.”

Meer beredeneerd, en derhalve om die reden meer belangrijk, is het rapport van den beoordeelaar, den heer Freeman, wiens opinie van gewicht is omdat hij een practische fabrikant is:—

“De tabak gegroeid in Natal was ruw, dik, grof, en zou geheel ongeschikt zijn voor de Europeesche markt. Het scheen of men het te geil liet groeien en de middel rib moet minstens 30 per cent. van het geheele gewicht uitgemaakt hebben. De aders waren betrekkelijk even dik en om die reden zou de tabak ongeschikt zijn voor een binder—het eenige mogelijke doel waarvoor het gebruikt kon worden.

“Men moet in het geheugen houden dat de tabaksoorten vereischt voor sigaar, sigaretten maken, of pijp doeleinden zijn alle absoluut verschillend.

“De atmosferische toestanden, de grondsoort, de bebouwing of behandeling zijn voor elke klasse geheel afzonderlijk en vereischen de diensten van speciale deskundigen die raad moeten geven en alles overzien. Zoodanige deskundigen kan men slechts bekomen door ze hooge salarissen te betalen, doch de onkosten kunnen gedeeld worden in een district of Kolonie, en voor hunne diensten *pro rata* betaald worden.

“In ieder geval als tabak met goed gevolg gegroeid zal worden, moet men afzien van de ruwe methoden van 200 jaren geleden en de hedendaagsche en wetenschappelijke cultuur van succesvolle concurrenten navenen.

“Ik ben overtuigd dat eenige zorg besteed aan de behouwing ruimschoots beloond zal worden, en dat als Zuid Afrika er in slaagt (en er bestaat alle redenen voor de meening dat het zulks wel kan) om tabaksoorten op te leveren die in eenige der boven vermelde vereischten voorziening zullen maken, is het gewis dat mijne fabrikanten alhier zullen die met genoegen verwelkomen en hunne landgenooten een vol aandeel van de profijt van wege deze cultuur zullen geven, die thans zoo te zeggen geheel door den vreemde in pacht is. . . Als de natuurlijke markt voor Zuid Afrikaansche produkten het Moederland is, dan moeten hare vereischten goed begrepen worden. De rauwe produkten, die tot gemeld land uit de Kolonies komen, behooren te kunnen concurreeren met de vreemde, zelfs wanneer zij niet beter kunnen zijn. Zuid Afrikaansche tabak doet dit niet. Meer zorg en stelselmatigheid zijn noodig. Groeien en bewerken op goed geluk af zullen natuurlijk nooit beantwoorden. Er zijn nu tekenen, echter, dat de geheele manier van Zuid Afrikaansche cultuur voordeelig verandert. Het advies der deskundigen wordt toegepast en het uitgeven van zaad onder toezicht van de Gouvernemenen heeft een goed effect gehad. Tot nog toe wat er gedaan is met goed gevolg, is in pijp tabak waarneembaar en in meer recente tijden in sigaretten ‘Turksch’ bladtabak. Sigaar bladtabak van goede kwaliteit is nog niet geproduceerd in de Zuid Afrikaansche Kolonies. Deze is nog de minst gevorderde van alle soorten cultuurproefnemingen. Doch tijd en zorg zullen wonderen verrichten.”

Met het doel om een tweede opinie in het laatste verband te verkrijgen werd een uitgekozen kistje sigaren gestuurd naar den Besturenden Directeur van de "United Tobacco Companies." Kaapstad, die sedert jaren een der grootste afnemers van blad tabak op de Londensche markt was. Zijn rapport leest als volgt, nl dat: "de tabak een groote verbetering is op de gewone Natalsche seroet, maar zij laten nog veel te wenschen over, vooral wat betreft de smaak. De twee groote punten ten gunste daarvan thans zijn, ten eerste dat de tabak goed brandt (hetgeen een eigenaardigheid van alle Zuid Afrikaansche tabaksoorten schijnt, *met uitzondering van het Natalsche blad dat aan de kust groeit*), en ten tweede dat zij niet sterk zijn. Zij missen, echter, geur en hebben een soort van grond-smaak, niet veel anders dan die opgemerkt in de mindere klassen van Brazilianen. Ik meen dat er meer aandacht gewijd moet worden aan het fermenteeeren (zweeten) van het blad want hiervan hangt de uiteindelijke smaak der tabak af bij de bewerking.

"Ik ben blijde te verneemen dat gij begonnen zijt met proefnemingen met drogen in schoorsteenen en ik meen gewis dat alle tabak, in schoorsteenen gedroogd, voor geruimen tijd een goede markt zal hebben. Iets over een jaar geleden had ik het genoegen uwen Landbouw Directeur te Pietermaritzburg een bezoek te brengen, en ik had toen een gesprek met hem over de mogelijkheid om de Natalsche tabak te verbeteren, en bij die gelegenheid vernam ik, voor de eerste maal, van de Weenen Besproeiings Nederzetting en de mogelijkheden van tabakscultuur aldaar en ik wensch u alle succes toe met de proefnemingen. Zooals ik begriip zijn de plaatsjes alle dicht op elkaar en men moet de tabak op een middenpunt behandelen."

Schrijver dezes wil geen onnoodig donker prent afschilderen omtrent den tegenwoordigen toestand van de tabak cultuur, doch een duidelijke erkenning van de tekortkomingen in bovengeschreven getuigenis bloot gelegd is een essentieel voorafgaande vereischte tot hare verwijdering. Geen nuttig doel kan bereikt worden door feiten over het hoofd te zien of ze weg te laten wanneer zij in een vriendschappelijke critiek aangehaald worden, die liever tot ons dadelijk voordeel geëxploireerd moeten worden. Gedurende het jaar 1905 heeft Natal uit het Vereenigd Rijk aan tabak alleen ter waarde van £64,590 ingevoerd, terwijl er slechts ter waarde van £660 alles te zamen uitgevoerd werd. One onmiddellijk doel, derhalve, is om een punt te zetten aan een tijdperk van stilstand en verkeerde pogingen door de discussie en practische demonstratie van verbeterde en goedgekeurde stelsels van cultivatie, droogmaken en fabriceeren, en in dit verband kan men geheel vertrouwen op de hartelijke samenwerking van allen die belang stellen in dezen belangrijken tak van den landbouw.

Een middel is reeds aan de hand gegeven, namelijk tabak fabrieken, doch een bezoek van de plantages in verschillende districten bevestigt de meening der Londensche critici. De fabriek is de laatste schakel in

den ketting van organisatie en een eerste en dringende vereischte is de wijziging en verbetering van de eerste stappen tot: bebouwing en droogmaken; het gebruik van het beste, verkrijgbare zaad; de zorgvuldige keus van localiteit en grond voor specifieke typen tabak; het aanwenden van geschikte mestsoorten; en de oprichting van behoorlijke schuren tot droogmaken. Het Sumatra blad, zooals van het veld genomen, is meer dan eens gebleken geenszins van mindere waarde te zijn wat weefsel en overeenkomst betreft dan de tabak voor omhulsel doeleinden door groeiers ingevoerd, maar werd naderhand geschaad in de behandeling wegens het gemis aan geschikte gebouwen. De open gras-schuiling, stal, of kraal is geen geschikt gebouw voor dit doel, en geen werkelijken vooruitgang kan verwacht worden zoolang de behandeling beschouwd wordt als slechts een proces van droogmaken. Het reguleeren van temperatuur en atmosferische vocht is noodwenig tot behoorlijk beheer van de veranderingen die plaats vinden in het blad gedurende dit tijdperk, en zoodanige regulatie kan slechts te weeg gebracht worden door middel van behoorlijk uitgedachte schuren.

DE KEUS VAN LOCALITEIT.

Eigenlijke proefnemingen te velde kunnen alleen belissen of een gegeven localiteit al de condities opleveren die vereischt zijn voor een specifieke type tabak, maar aanvankelijk denke men aan een regel van algemene toepassing nl., dat goede rook tabak niet geproduceerd kan worden binnen een zekere distantie van de zee-kust. Het "branden" van tabak wordt schadelijk aangedaan door de aanwezigheid van chloor in de lucht en grond, en tengevolge worden plantages in Cuba, Sumatra en de Philippijnen, oppervlakten die ideale condities hebben voor deze cultuur, niet aangetroffen binnen tien mijlen van af de zee. Goede brandende hoedanigheden zijn kenmerkend in het Zuid Afrikaansche blad, een enkele uitzondering, als te voren gemelde zijnde de tabak gegroeid in de Natalsche kust streek. Aan de andere hand schijnen de warme, geschildde valleien, gelegen van tien tot vijftig mijlen van de kust, en een ruimen regenval genietende, zooals die reeds geëxploiteerd te Mid-Illovo, Verulam, Chaka's Kraal, en Eshowe en andere districten van Zululand; de best verkrijgbare plekken op te leveren voor het daarstellen van sigaren-blad plantages, terwijl zekere middellandsche en hooger gelegen districten zooals Weenen, Vrijheid en Paulpietersburg een benijdenswaardige plaatselijke reputatie verkregen hebben voor pijp tabak, die nog hooger aangeschreven zal worden door betere faciliteiten voor het droogmaken en de behandeling aan te wenden. Weinig aandacht is tot nog toe gewijd aan de bebouwing van sigarettentypen, maar onderworpen aan toekomstige verbetering schijnen de resultaten van een proef gewas te Weenen aan te duiden dat dit district ten minste een geschikte centrum is voor de organisatie van uitgebreide operaties. De localisatie van typen brengt vele voordeelen mede, want gebouwen en machinerie

kunnen moeielijk schikbaar gemaakt worden tot behandeling van een gemengd gewas, en de kanzen van een planter op succes zijn veel beter wanneer de aandacht gewijd wordt aan de vereischten en eigenaardigheden van een enkel soort blad. Een reputatie wordt, gelykerwijs, meer gemakkelijk gevestigd door een persoon of district voor een enkele soort goederen dan voor allerhande goederen, en een beter markt kan verkregen worden voor groote perceelen van eengalig gehalte dan voor een antal kleine en afwijkende bezendingen.

DE KEUS VAN GROND.

De bestaande aanvraag in Zuid Afrika is en voor een lichter kleur en voor een minder sterk soort pijp tabak, die de vrij-brandende hochdanigheden en de kenmerkende smaak van Boer tabak zal behouden, en voor groote hoeveelheden goede Turksche en Bright Virginiaansche sigaretten blad tabak. Een markt voor deze typen bestaat reeds en het is in 't oog loopend dat het in 't voordeel is van den planter om zich aan den drang van de omstandigheden over te geven liever dan te probeeren den verbruiker producten op te dringen waarvoor de aanvraag nog in het leven geroepen moet worden. In de afwezigheid van een goedkoop en goede substituit, heeft zware, grove pijp tabak in het verleden een min of meer bevredigende prijs opgebracht, maar het kan nimmer op gelijke voet concurreeren tegen de superieure tabak. Hoe rijker de grond, hoe zwaarder en geiler de tabak; hoe zwaarder de tabak, des te grover is het en hoe minder per pond zal het opbrengen. Om een deel van het gewicht van den oogst te verliezen en diens markt waarde te verdubbelen is ware huishoudkunde, en de tabaksoorten thans in Zuid Afrika geproduceerd die de hoogste prijzen behalen zijn bijna algemeen gegroeid in zand gronden of zandkleien met behulp van mestsoorten. Geen methode van drogen of fermenteeren (zweeten) zal het effect van een zwaren grond op de kleur van het blad tegenwerken. De lichtgele kleur van Bright Virginia tabak, en de rijke gouden kleur van het beste Turksche blad zijn oorspronkelijk te wijten aan den grond waarin de planten gegroeid worden, en worden alleen ontwikkeld door de latere behandeling. Een warme zanderige kleigrond, goed gedraineerd, rijk, diep en kalkhoudend, is 't geschikt voor bijna alle soorten tabak. Hoe meer zanderig, tot op een zekere hoogte, de grond is, des te beter zal de kwaliteit van de tabak zijn; hoe meer kleiachtig de grond is, hoe minder van kwaliteit zal de oogst zijn, hoewel het gewicht bevredigend zijn zal. Op geen gewas is de uitwerking van staande water zoo merkbaar als op tabak en geen gewas wordt zoo min benadeeld door droog weer. Goede natuurlijke of kunstmatige draineering is derhalve essentieel tot bevredigende resultaten. Een geschuilde positie is ook van het hoogste belang en bescherming tegen den wind moet verzekerd worden, zoo noodig, door boomen aan te planten of zelfs door rijen mielies in het plantage aan te brengen.

Alle soorten tabak zijn ten zeerste vatbaar voor verandering van lokaliteit, en als verscheidene ingevoerde variëteiten voor een reeks jaren gegroeid worden van plaatselijk gewonnen zaad zullen zij uiteindelijk gemeenschappelijke kenmerken aannemen, geput uit den grond en de klimaat, en hunne oorspronkelijke afzonderlijke eigenaardigheden verliezen. De resultaten van zulk een proces kunnen waargenomen worden in de zoogenaamde Natalsche tabak die een product is van verscheidene afzonderlijke sigaar tabaksoorten, en een voorbeeld van de ontaarding die binnen een paar jaren plaats kan hebben. Het is raadzaam dikwijls in te voeren van de localiteit waar de bijzondere tabak hare hoogste voortreffelijkheid bereikt en daardoor de kwaliteit waarvoor het beroemd is te verzekeren. Zulk een stelsel is nu in zwang in al de oudere tabakgroeiende landen, en een wereld-wijde handel wordt gedaan in Cubaansch zaad uit het district Vuella Abajo. In opvolging van deze politiek zijn voorraden als hieronder vermeld verkregen om aan planters tegen kostprijs te verschaffen en, het is te hopen, een eerste hinderpaal tot vooruitgang is daardoor verwijderd. Tabak wordt geklassificeerd volgens de aanwending daarvan, hetgeen kan zijn als sigaar vuller of omhulsel, sigaretten tabak, voor de pijp, koek, pruimen, enz., en in elke klas worden een grooter of kleiner aantal verscheidenheden aangetroffen, gegroeid voor het speciale doel in verschillende localiteiten. Hiervan is eene kleine lijst opgesteld, gegrond op de ondervinding van de planters in de verschillende Kolonies van Zuid Afrika, hoewel verder wijziging waarschijnlijk noodig zal zijn voor een bepaalde keus van standaard typen voor Natal gemaakt kan worden.

KEUS VAN SOORTEN.

Succes in het planten van tabak moet grootelijks afhangen van de zorgvuldige consideratie van klimaat, grondsoorten en markten, waarna het een zaak voor de groeier is om proeven met zoodanige typen te nemen als blijken de best te zijn onder soortgelijke omstandigheden elders. Over het algemeen wordt een grooter warmte vereischt voor de productie van geurige tabaksoorten die geschikt zijn voor sigaarvulling; de grootste hoeveelheid van de wereld voorraad pijp en sigaretten tabak wordt gegroeid in de warmere gedeelte van de gematigde luchtstreek, terwijl de koeler streken dunne bladeren met weinig aroma opleveren, doch geschikt voor sigaren omhulsels. De lichtste aarde begunstigt den groei van sigaretten en lichte pijp tabak, zwaardere grondsoorten worden gezocht voor donkere pijp tabak en pruim tabak, terwijl de rijkst mogelijke zanderige kleisoorten wenschelijk zijn voor de productie van tabak voor sigaarvulling. In alle gevallen moet, echter, te veel klei vermeden worden. De volgende classificatie en korte beschrijvingen kunnen een weinig hulp bieden in de kwestie van keus:

TABAK VOOR SIGAREN.

Cubaansche.	Connecticut.
Zimmer Spaansche.	Havana.
Sumatra.	Braziliaansche.

SIGARETTEN TABAK.

Turksche (Aromatisch, Cavalla, Smyrna, Samsam, Bafra).
Bright Virginiaansche—Geel Orinoko.

LICHTE PIJP-TABAK (voor schoorsteen drogen).

Hester.	Warne.
Goldfinder.	Bullion.
Conqueror.	

DONKERE PIJP-TABAK (voor lucht drogen).

Honduras.	Medley Pryor.
Burley.	

Cubaansche.—Levert een klein blad, maar als het van ingevoerd zaad gegroeid wordt, behoudt het veel van de aroma (geur) van Cuba-gegroeid tabak. Het wordt gebruikt voor de fijnste sigaren, beide voor vulling en omhulsels.

Zimmer Spaansche.—Levert een middelmatig blad van donkere kleur en zeer geurig. Gebruikt voor gewone sigaren als vulsel en geeft een zwaren oogst per akker.

Sumatra.—Levert een heel dun blad van fijn weefsel en kleine aderen. Behoort gegroeid te worden voor sigaren omhulsels, onder bescherming van doek of latten indien mogelijk.

Connecticut.—Levert een heel breed, fijn blad, sterk, zijdachtig en veerkrachtig met kleine vezels. Geschikt voor omhulsel of vulling.

Havana.—Zeer dun, fijn blad van keurig smaak. Gebruikt voor omhulsel of vulling.

Braziliaansch.—Levert een grover, zwaarder tabak dan voorgemelde. Gebruikt voor goedkoopere sigaren of om met de betere soorten te mengen.

Turksche.—Een heel duidelijk type van tabak, waarschijnlijk herkomstig uit Zuid Amerika. In Turkije wordt het algemeen in de zon gedroogd maar in Zuid Afrika is het met goed gevolg in schoorsteen gedroogd.

Licht Virginiaansch.—Verschillende typen worden gegroeid. Bladeren lichtgekleurd en van keurige smaak. Wanneer in schoorsteen gedroogd is de kleur van de tabak van lichtgeel tot lichtbruin.

Hester.—Levert een breed hartvormig blad, fijne vezels en zijdachtig. Schoorsteen gedroogd is de tabak voor pijp gebruik zeer helder geel of bruin.

Goldfinder.—Een gelijksoortige heldere tabak als voorgaande voor cultuur in zanderige grond.

Warne.—Een zeer populair soort voor de productie van geel schoorsteen-gedroogde tabak.

Bullion.—Een Witte Burley Kruisteelt met Hester, breede blaren van fijn weefsel. Levert een weinig zwaarder, geel tot bruin, pijp tabak bij schoorsteen droging.

Honduras.—Een krachtige plant en een der beste voor bruin pijp tabak van middelmatige sterkte.

Burley.—Levert een lang, nauw blad, wit van aanschijn zoolang het groeit. Geschikt voor rijke kalksteen grond en de productie van een zwaren oogst van pijp tabak van volle smaak.

Medley Pryor.—Levert een heel breed, zacht, zijdachtig blad, met taaie vezels. Behoort gegroeid te worden in rijke zware gronden voor de productie van donkere pijp tabak van volle smaak.

BEREIDING VAN DE ZAADBEDDING.

De meeste mislukkingen in tabak planten ontstaan in de zaadbedding en een zorgvuldige studie van de gevaren waaraan de plantjes bloot staan behoort gemaakt te worden. De ontkieming is ietwat lang en dikwijls duurt het een maand en zelfs zes weken voor de plantjes boven den grond verschijnen. Deze eigenaardigheid is van belang tengevolge van het feit dat zelfs het zorgvuldigste hand-wieden stoort de tabak worteltjes en verzwakt de planten buitengewoon veel. Iedere poging behoort derhalve aangewend te worden om eene bedding te verzekeren die van den aanvang af vrij is van onkruidzaadjes. Dit behoort zoo vroeg mogelijk in den winter bereid te worden, een rijk zanderige klei wordende uitgezocht in een geschuilde positie. Na de bedding afgestoken is, die geen vier voet in de breedte te boven moet gaan, moet men kreupelhout en brandhout op de oppervlakte pakken in voldoende hoeveelheid om een sterk vuur voor minstens een uur aan te houden. Dit zal beide de onkruidzaden en insecten eiers die aanwezig kunnen zijn vernietigen en daarenboven een belangrijk meststof voor de planten opleveren. Zoolang de asch nog warm is moet de bedding ter dege omgespit worden, zoo diep mogelijk, en de oppervlakte heel fijn geharkt worden. Alles wat den groei der planten mag hinderen, of hare latere verwijdering, moet zorgvuldig weggenomen worden en de grond zoo fijn mogelijk gemaakt worden. Daarna moet men het zaad mengen met honderdmaal deszelfs gewicht met asch of fijn, droge grond en zaaien in de evenredigheid van een ons op een honderd vierkante yards van de zaadbedding. Indien zordvuldig aangewend zal een fingerhoed vol zaad van de pijp tabak soorten genoeg zijn om een akker tabak te planten, hoewel tien maal zooveel planten noodig zijn om een gelijke oppervlakte met Turksch tabak te bedekken waarvoor een dichtere aanplanting gevolgd wordt. Een lichte roller over de bedding getrokken zal voldoende dekking aan de zaadjes geven, die onder geen omstandigheden diep gezaaid moeten worden. De oppervlakte behoort nu nat gemaakt te worden met zwakke

mestwater, bereid door 10 pond hoendernest in 12 gallon water op te lossen, en licht bedekt met stroo. Een dubbel koers steenen behooren dan om den kant der beddingen gelegd te worden, waarop geplaatst worden hessische of servische bedekte ramen tot bescherming van de plantjes tegen de koude, hitte en insekten aanvallen. Te veel nadruk kan niet gelegd worden op de noodzakelijkheid voor deze voorzorg. Men behoort met tusschenpoozen van een week te zaaien, om een voorraad plantjes te hebben tot verplanting wanneer het weder gunstig is om ze tot de plantages over te brengen. Het is vergeefs om datums vooraf voor dit doel vast te stellen daar de planter door de alsdan heerschende omstandigheden geleid moet worden. De planten in de zaadbedding moeten altijd genoeg nattigheid hebben en men moet zorgen dat zij steeds krachtig groeien. Als de regenval onvoldoende is, moeten zij bewaterd worden met een zwakke vloeimest zoo dikwijls nodig. Indien onkruid opkomt ten spijte van de voorgemelde voorzorgen, moeten zij met de hand met de grootste zorg verwijderd worden. Dikwijls zal het gebeuren dat zelfs het zorgvuldigste zaaien een te dikke bedding ten gevolge heeft, in welk geval de planten uitgedund moeten worden door een hark over ze heen te trekken.

(Wordt vervolgd.)

Grooming a horse answers two ends. It removes from the skin those particles of perspiration, dust and dirt which would otherwise impede and clog the free action of the sweat and oil glands. Then it removes the scurf or worn-out cells which are no longer required on the surface of the skin, and which would, especially when cemented together by particles of sweat, add to the obstruction of the glands.

KILLING FRUIT-FLY.—In a report to the Under Secretary for Agriculture, Western Australia, the Chief Inspector under the Insect Pests Act (Mr. T. Hooper) states that, in combating the ravages of the fruit-fly, he carried out a series of trials for the purpose of finding out the best means of killing them. The materials used were kerosene, turpentine, benzine, and naphtha, placed in tins and scattered about the orchard, where they were allowed to remain for twenty-four hours; at the expiry of this time the tins were examined with the following results:—Turpentine: 6 tins used, 2 flies found in one, all the rest empty and dry. Benzine: 8 tins used, 1 fly in one and 4 in another, all tins dry. Naphtha: 4 tins used, no flies caught, all tins dry. Kerosene: 6 tins used, 149 flies caught (every tin containing some), all tins moist.

Oost Kust Korts.

BENOEMING VAN ADVISEERENDE COMMISSIES.

De volgende regulaties voor de benoeming van Adviseerende Commissies onder de Oost Kust Koorts Akte, 1906, zijn door Zijne Excellentie den Gouverneur in Rade goedgekeurd:—

1. In elke Magistraat's Afdeeling een besmet area verklaard in termen van Sectie 3 van Akte No. 54, 1906, zal er eene Commissie bestaande uit acht leden benoemd worden, waarvan zes gekozen zullen worden op eene jaarlijksche publieke vergadering voor dat doel door den Magistraat van de Afdeeling opgeroepen.

Minstens veertien dagen kennis zal in de *Gouvernements Gazette* gegeven worden en eene kopie van zoodanige kennisgeving zal op het kennisgevings-bord van des Magistraat's Kantoor, en op andere publieke gebouwen aangeplakt worden, en zal ook aan de politie overhandigd worden, ter vertooning aan de boeren met hunne gewone patrouilles.

2. In geval meer dan zes nominaties ingezonden worden, zal de verkiezing van leden der Commissie per ballotage geschieden.

3. De Districts Veearts en de Vee Inspecteur van het District zullen *ex officio* leden van de Commissie zijn.

4. De Commissie zal haar eigen voorzitter aanstellen.

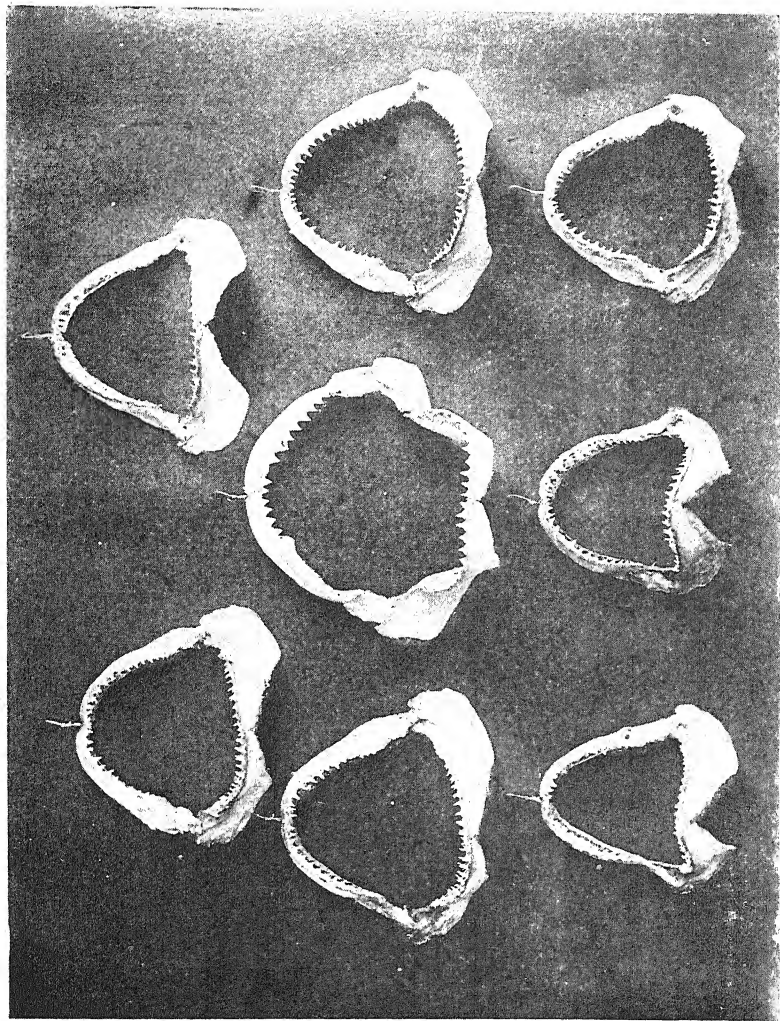
5. In geval van eenig verschil van meening onder de Commissieleden, zal de meerderheid beslissen.

6. Drie leden zullen een quorum uitmaken.

7. De plichten der Commissie zullen zijn: (a) In overweging te nemen en te besluiten over eenige applicatie, die haar onderworpen wordt door den Principalen Veearts om beesten binnen het District uit andere Districten te brengen; (b) om permitten uit te reiken als individueele leden der Commissie voor de beweging van beesten binnen hunne Districten alwaar zoodanige beweging veroorloofd wordt door den Minister van Landbouw; en (c) algemeen den Minister van Landbouw raad te geven en te assisteren in alle zaken ontstaande uit de Akte.

8. De Commissie zal minstens eenmaal per maand bijeenkomen, maar de Voorzitter kan de leden der Commissie ten eenigen tijd bijeenroepen met het doel om te discusseeren eenige zaken of kwesties verbonden aan de Oost Kust Koorts die men wenschte voor het Gouvernement te brengen, en het Gouvernement kan ten eenigen tijd eene speciale vergadering, door middel van den Districts Veearts of Vee Inspecteur, oproepen voor dergelijke doeleinden.

9. Alle aanbevelingen of voorstellen van de Commissie zullen het Gouvernement door middel van den plaatselijken Veearts of Vee Inspecteur toezonden worden.



A COLLECTION OF SHARKS' JAWS.

Taken from sharks caught by Mr. J. J. Stephenson, of the Department of Agriculture.

10. Het Gouvernement zal de macht hebben van de Commissies te verwijderen eenige leden die verzuimen drie aaneenvolgende vergaderingen der Commissie bij te wonen, of die strijdig handelen met de machten hen bij deze Regulaties verleend.

11. Leden der Commissie zullen niet gerechtigd zijn tot eenige bezoldiging van hunne diensten.

12. Eenige vacaturen ontstaande op zoodanige Commissie gedurende het jaar zullen door de overige Commissieleden opgevuld worden, onderworpen aan de goedkeuring van den Minister.

13. De Districts Veearts of Districts Vee Inspecteur zal notulen van alle verrichtingen der Commissie houden en bewaren, en alle zoodanige notulen zullen aan goedkeuring onderworpen worden op de vergadering eerstvolgend op die waarvan de notulen zijn. Zoodanige notulen zullen aangeteekend worden in een boek voor dat doel gehouden en zullen de namen van al de leden aanwezig op elke vergadering behelzen.

POLYEMBRYONY OF THE ORANGE.—In the second volume of *Agricultural News* (Barbados) it is explained that, in the orange, besides the embryo which proceeds normally from the fertilised egg-cell, other embryos arise from the tissues of the nucellus. It is assumed that the occasional polyembryony of the mango is also effected in this way. It is well known that one orange seed often produces several seedlings. A writer in a recent number of *Agricultural News* states that, on one occasion, he found no less than eight such seedlings. These were carefully separated and grown. If they, too, he remarks, had been left together, the strongest growing one would doubtless have stifled the others. It is probable, he continues, that only one of these embryos is the result of fertilization, and that the rest are developed asexually in the ovule. For, on hybridizing oranges, when the seedlings produced from one seed are separated and grown apart, it has been found that only one shows the effect of hybridization. Since the others are the result of asexual propagation, it is to be presumed that they might inherit all the qualities of their parent, just as if they had been propagated by budding. Hence it might be worth while, in growing good qualities of oranges from seed, to separate the seedlings from each seed and let each grow up. It seems not improbable that three-quarters or more of the orange trees so produced might be nearly exact replicas of their parents. If this is so, the fact that the orange has been grown from seed in the West Indies for some time without greater deterioration is partly accounted for. It would be of interest to know whether all of the two or more embryos which occasionally occur in the mango seed result from fertilization, or not.

Horsesickness.

By H. WATKINS-PITCHFORD, F.R.C.V.S., F.R.S.E.

THE following paper was recently read at the Natal meeting of the S.A. Association for the Advancement of Science. Although in the form of a Presidential address to an audience interested particularly in science, it contains details of general interest, and makes an announcement towards its close which gives promise of attaining at last the long sought means which will produce with safety a mild and, it is hoped, protective form of the disease, both in the horse and the mule.

It was not without much diffidence that I decided to accept the invitation to fill the office of President of this Section. While some achieve greatness others have greatness thrust upon them; and in this latter category I feel my position at the present moment places me. Our Sections—literally from A to Z—including Agriculture, Bacteriology, Botany, Forestry, Physiology, and Zoology, comprise a field so broad and embrace such widely-sundered lines of scientific thought that it is obvious one individual, though he may have the hardihood to preside over such a Section, cannot pretend to more than a superficial knowledge of the majority of subjects included therein.

It occurs to me that the Schoolmaster of Goldsmith's "Deserted Village" would have made an excellent sectional President, for you will remember that amongst other scientific acquirements:

"Lands he could measure, time and tides presage,
And e'en the whisper ran that he could gauge:"

while so renowned among his associates were the other attainments of this versatile individual that:

". Still the wonder grew
How one small head could carry all he knew."

Since Goldsmith wrote his lovely poem, however, the Age of Specialism has overtaken us, and no man who endeavours to make a profound study of one branch of scientific thought can hope to make other than limited excursions into the fields of science outside his own immediate province.

The old classical prohibition *Ne sutor ultra crepidam* was never more applicable than in these later times of strenuous endeavours along specialised lines; and every "Cobbler" who sticks to his own particular "last" finds it provides him now-a-days with sufficient occupation of time and thought to fill a busy day. I shall not therefore attempt to

comment or trespass upon other subjects of our Section (with which I can claim but a nodding acquaintance, so to speak), but shall confine my remarks to one small corner of my own special subject—Bacteriology—knowing that, even after so narrowing down my horizon, I shall frequently be confronted with the unexplored and unknown, and at best be able to throw but a feeble ray of light upon a subject in which all South Africans must be more or less interested.

The Horse—with his congener the Mule or Ass—has been bound up with the progress of man from remotest times, and, though he is perhaps less to us in these days of mechanical appliance than he was to our forefathers, a moment's reflection will suffice to show that he is still indispensable to us in our pursuance of the arts of Peace or the successful waging of War. The welfare of the horse—for it is with the horse that I would deal—and the suppression of a horse-disease which has almost extinguished the species in vast tracts of our Continent towards the Equator—a disease which year by year demands from the horse-owner a heavy toll—constitutes a question to which none of us can feel indifferent, involving as it does a problem nearly related to the prosperity, economical and social, of the land in which we live.

With the barren speculation as to when, or in what manner, this disease first gained a footing in our sub-Continent I do not wish to engage your attention, but we know from the records of the Cape Colony that this equine scourge troubled the very early settlers as much as it does the South Africa of 1907; and, were it not foreign and perhaps inappropriate to the present paper I think I might interest you for some time by laying before you the theories held in early times concerning the causation of the disease, theories which we, in the clearer light of progressive science, may be inclined—though not perhaps altogether reasonably—to deem fantastic and absurd. Cold, dew, miasma, cobweb, the precipitation of pathogenic spores from high altitudes, the gummy exudation from our indigenous thorn or mimosa trees, mists and winds from certain points of the compass, besides many other theories, have each in their turn been advanced to account for the incidence of horsesickness.

It is, of course, easy to argue from the cause to the effect when the former has been established, but it has always struck me as strange that amid so many theories and speculations the parallel of the Malarial disease of man had escaped application to horsesickness. Both are essentially paludal—that is marshy diseases—and the conditions favourable to the spread of the one must always have also been concerned in the manifestations of the other disease.

Shortly after coming to the country in 1896 I suggested, in some of my earlier observations, the parallel between malaria and horsesickness, and attempted to apply the comparison to the solution of the question of the cause or etiology of the latter disease. An irreconcilable difference, however, appeared to exist in the presence, microscopically, in one disease

(malaria) of a large and well demonstrable organism, and in the other of an ultra-microscopic organism which rendered the parallel between the two diseases a difficult one to accept. The similarity in some points between horsesickness and the human disease yellow fever did not at the same time escape comparison, for while the paludal influence was existent in both diseases the ultra-microscopic cause was common to horsesickness and yellow fever, i.e., the *materies morbi*, germ, causal factor, or whatever one elects to call it, was invisible to the most careful microscopic scrutiny in both yellow fever and horsesickness, and was capable of passing through the pores of a porcelain filter fine enough to arrest the passage of all known microbes. In view of certain parallels in the incidence and morbid anatomy of malaria and yellow fever of man, I hazarded the suggestion that the causal factor of horsesickness was a flying insect, probably a mosquito; and this opinion received strong support from the subsequent discovery that yellow fever also was due to the attack of a mosquito (*Stegomyia fasciata*). Thus horsesickness as an insect-borne disease with an ultra-microscopical organism found a further parallel in the yellow fever of man.

It was not, however, until 1901 that I was able to put this theory to the test, for the visitation of rinderpest and the late Boer war prevented the carrying out of any adequate line of experimental work. Field experiments, however, conducted in 1901 resulted in my being able to demonstrate the agency of a flying-insect in the production of the disease and to suggest a practical method of preventing the same by keeping stables, horse-lines, etc., and their immediate environs enveloped from sunset to sunrise in a haze of smoke generated by smouldering fires of damp hay, stable litter, etc. Where such measures have been adopted, the best results have been secured, but where the precaution has been undertaken in a half-hearted and perfunctory manner or where it has been necessary to use horses after sundown or even leave them standing still during sultry days in dangerous localities, the disease has manifested itself, though such animals may have been stabled at night in a smoky atmosphere.

The actual species of mosquito or blood-sucking fly concerned in the production of the disease is still a matter for future research, but the decision of this point cannot, I think, have any very great weight in regard to the question of the prevention of the disease, which is the all-important question from the point of view of the horse-owner as well as that of the practical investigator.

The problem of protection or the production of an immunity to this disease has exercised the minds of scientific workers in South Africa, particularly during the last decade. Efforts towards this end have even been made also by scientists in London, Paris, and elsewhere, but though such men as Koch, Bruce, Danyz and Bordet of the Pasteur Institute, Theiler of the Transvaal, and Edington of the Cape, have

brought their experience to bear on the problem, no adequate means of immunising—and so preventing the horse contracting the disease—have been devised.

While each worker has added something to the sum of our knowledge, no one has been able to do for horsesickness what, for instance, Jenner did for small-pox or Pasteur for rabies. Edington of the Cape, who worked long and laboriously at the problem, was the first to show, in 1900, the possibility of producing by hyper-immunisation a serum which would to some extent arrest or modify the course of the disease. Professor Koch later, in 1904, followed on much the same lines, but did not materially advance our prospects of a practical method of inoculation. Dr. Theiler, however, of the Transvaal, pursuing the same system of serum-therapy, has been able at last to devise a method whereby the mule can be rendered practically immune to attacks of the disease, and to this worker, who has done so much for science in other branches of preventive medicine, we must accord the honour of first practically applying a system of prevention which—though still on approbation as regards the length of immunity conferred—bids fair to solve the difficulty of keeping the mule alive in districts where it previously ran much danger of succumbing to the disease. The system employed, as you are probably aware, is in brief and simple language somewhat as follows:—

A mule recovered from the disease is subjected to repeated and increasing injections of blood taken from other mules suffering from the disease. In time its blood becomes strongly antidotal, and when this blood—or the serum of the blood—is injected into healthy mules together with a small dose of virulent blood taken from a mule suffering from the disease, a mild form of the disease follows which protects against a natural and possibly fatal attack of the disease. The quantity of this antidotal serum necessary to immunise one animal is 300 c.c., which is equivalent to about a pint of the original blood of the immune mule, which mule would, upon this computation, furnish sufficient serum to immunise 8 to 10 other animals at one abstraction of blood.

The degree of susceptibility of the mule, however, to the disease is considerably less than that of the horse; and a system which can with safety be applied in the case of the mule, fails when the attempt is made to apply it in the case of the horse.

The marked susceptibility of the horse to the disease does not constitute so great a difficulty to the scientific worker, however, as the fact that the *degree* of susceptibility between *different* horses is extremely variable, so that preventive measures adjusted safely to one prove dangerous to others.

This is the main difficulty which has confronted successive investigators and checked the devising of a practical system of preventive inoculation. Where the subtle difference lies between mule and horse or horse and horse, we know no more than we know the reason why the

sheep of Algeria defy a disease (anthrax) which is fatal to sheep in all other countries.

In following a case of infection by horsesickness in the horse, we find that, when a fatal issue is about to ensue, certain of the white cells of the circulating blood become greatly reduced in their numbers, and, conversely, when an animal has become infected and has successfully resisted the disease, these particular white cells—the polymorphonuclear leucocytes—become largely increased in numbers. Successful resistance, therefore, to the disease-attack increases the number of these particular cells, and defeat and approaching death can be foretold by their diminution and disappearance.

Knowing the functions and behaviour of these cells in diseases other than horsesickness, we are justified from the above facts in attributing to the class of white cell an essential part in the defence of the system against horsesickness. The highly resistant or hyper-immune horse which can tolerate enormous doses of infectious blood does not, however, show any permanent increase in the number of these cells; and, further, the blood of such a horse could be abstracted and replaced by the blood of a nominal horse—all of these cells being thereby theoretically removed—and still the animal would retain its immunity or resistive power to the disease. The defensive mechanism, therefore, of the immune horse cannot be entirely with the white cells circulating in the blood.

Through the researches of Metchnikoff, however, we know of the existence of other cells—the so-called “fixed cells”—which, while immobile and attached to the various organs and tissues in which they are found, are nevertheless able to exert a defensive action similar to that of the free or wandering white cells. When once these cells, free and fixed, have become trained to take the offensive against the microbe of horsesickness—Metchnikoff speaks of the “education” of the cell—the animal successfully resists and so becomes immune. Thus immuned successive re-infection, either naturally or artificially, strengthens the defensive mechanism and increases the degree of immunity to such an extent that we are able, if we wish, to abstract the animal’s blood and utilise this form of the defensive and prohibitive principle in the so-called “immune serum.”

As far as we know there is only one way in which the horse can become actively immune, and that is by fighting and overcoming the microbe of the disease. Natural recoveries from horsesickness, however, are not at all so rare an occurrence as we have in the past supposed. When the disease has progressed as far as the stage of effusion into the lung and heart sacs, recovery is indeed a forlorn hope, but I am convinced that thousands of horses are annually infected with horsesickness and recover from the same without raising the suspicion in their owners’ minds of the existence of the disease. In fact, the horse is quite able to “put up a fight,” as the saying is, against the disease, and often to win the battle.

through the help of that best of physicians, viz., *medicatrix naturae*; but where the infected animal is handicapped by debility, bad management, hard work or excessive exercise, the disease becomes established in its familiar and recognised phases, and, when matters have gone thus far, vain is the help of man.

If natural attacks and recoveries are frequent, it would seem that no great difficulty should be met in securing recovery from experimental infections. Such, however, is not found to be the case in the horse with his very varying degrees of susceptibility; and hitherto the introduction of even minute doses of virus—if sufficient to evoke a reaction at all—have been attended by the gravest risk of the disease “getting out of hand,” so to speak, and imperilling the animal’s life, even where large quantities of immune serum are given in the hope of holding the infective process in check. With the mule, whose susceptibility is more nearly on one plane, there is much less tendency to this “getting out of hand”; and it is possible, as Theiler has shown, to pilot this animal safely through the infection by the use of immune serum in large doses injected together with the virus of the disease.

Where, then, is the best point for attack in this problem of the protection of the horse?

My own impression—formed from following closely the work of Edington and Koch, as well as from my own laboratory experiments—is, that serum-therapy (*i.e.* the use of hyper-immune serum as a controlling and resisting agent) will not assist us greatly. Serum is uncertain in its effect, often over-restraining by a passive immunity when we seek to produce a reaction, and as often failing to exert a sufficiently restraining influence, and permitting a dangerous reaction to ensue. We cannot standardize it and so adjust the exact dosage, because the virus of horsesickness differs greatly in its virulence and varies from one locality to another. If we attempt to mix the different strains of virus in the hope of securing a more uniform degree of infection, we are still confronted with the difficulty that the horse, which is practically the only animal suitable for the purpose of standardizing the virus upon, differs greatly in his degrees of susceptibility; so that a given dose of our uniform virus, which would produce in one case a mild attack, would cause death in another. This prevents our estimating or prearranging, except in the most general way, the restraining or protective influence of such serum in any given case of infection.

I dare not attempt to dogmatise or to put forward my views on this point as final, but I am not sanguine that the application of serum-therapy to the immunisation of horses against horsesickness will be attended with any very practical or satisfactory results.

The point of attack, therefore, has for some time past seemed to me to be rather in the direction of attempting the modification of the actual virus itself, and, by reducing it to its lowest degree of virulency without

impairing its activity, to render it safe for the inoculation of even the most susceptible horse. As the susceptible horse will naturally be the first to fall a victim to the conditions of natural infection, I am sanguine that it will be proved that the establishment of an immunity sufficient to meet this degree of susceptibility will be sufficient to meet the practical needs of the question. In other words, if we can protect our most susceptible horses, the less susceptible can be left to look after themselves in normal seasons.

Such an attenuated virus would be a vaccine; and it is by the use of such a vaccine that I hope this very knotty problem in preventive medicine is going to be solved. The Scientist can accept nothing which has not stood the test of time and the proof of varied application, but I feel sanguine that such a vaccine is within our grasp.

Printed on the screen you will see a number of recent charts both of horses and mules; and if you are familiar with the reading of a temperature chart, you will see the pronounced reactions which most of these animals have gone through, reactions produced by different strains of horsesickness virus, which has been attenuated so as to produce a definite though controllable, form of horsesickness. These reactions on this side have been produced with the most virulent strain of virus I could procure, while those are from virus taken from other sources. A small percentage of the horses inoculated in this manner have proved refractory, but I am hopeful that, if a horse fails to react to large doses of this vaccine, he will prove refractory to the conditions of natural infection. The reaction, as you see from the charts before you, is a well marked one; and if modified attacks of horsesickness confer any substantial degree of immunity (a point on which all workers with the disease seem agreed), I am satisfied the main difficulty of producing with safety a modified attack of horsesickness has been overcome.

Whether the horse can be safely passed through this modified phase of the disease in the warm weather, whether a further inoculation of a stronger or less attenuated virus will be necessary to ensure complete resistance, how long the immunity acquired from the mild attack will last, and whether it will be necessary to adjust the vaccine to differing localities, are all questions, besides many others, which future observation must decide.

My resources in time, help, and material have in the past been straitened, and I have envied (I hope in no unscientific spirit) the ample resources of other workers in the same field. More adequate facilities are now at command, and I hope future progress will be commensurate with broadening opportunities.

I have intentionally refrained from referring to details of technique, and with my reasons for reticence in this respect I believe you will not be found to disagree. Much more extended observation is necessary to show the limitations of the method, to prove its practical usefulness and

to bring to light and correct its drawbacks, and for the satisfactory arrangement of these points time and increased facility are essential. I have, therefore, thought it better to bring the foregoing subject to your notice as an Interim Communication (a Progress rather than a Final report) and wait a future opportunity of making a final communication based upon the results of extended observations under practical rather than laboratory conditions.

Our monetary loss in Natal during the past season has been at least £12,000, and £50,000 is a small estimate of the loss to South Africa; but, apart from economic considerations, the mass of animal suffering reflected in such figures is sufficient to render the hope of its alleviation a fortunate ambition for all workers at this disease who, though perhaps not successful in solving the main problem of entire prevention, at least enjoy the privilege of helping in some measure to advance the quest to a final and successful issue. We can safely say the successful man will owe as much to the efforts of others as to his own endeavours, for investigations of this sort are progressive and one worker builds on the foundation of his predecessor.

If a poor farm is taken in hand by an energetic man who is up-to-date in his knowledge and practice, it can generally be transferred in a few years into a satisfactory property (says the *Queensland Agricultural Journal*). The growth of a good green crop by the help of liberal dressings of phosphatic fertilisers is the first step, and afterwards the ploughing under of the green stuff. When the soil is provided with the humus and nitrogen of green crops, it will begin to improve and soon pass from the condition of an invalid into a farm of robust condition.

"Georgicus," writing in his monthly notes on Coast Agriculture to the *Mosquito*, reproduces the letter by Mr. F. W. R. Panzera that appeared in last month's *Journal on Burlington Hybrid mealies*, and adds the following note:—"I know this mealie well, and have always grown some for table use. It is infinitely superior for this purpose to the ordinary mealie, and I have never been successful with the regular American sweet corn. This mealie is a hybrid between the sweet corn and the ordinary mealie, and evidently is most prolific. I would recommend Coast agriculturists to apply to Messrs. Kirchhoff or Mr. Panzera for seed. Near Durban a good many acres might be profitably planted in succession, for sale as green mealies."

South African Products Exhibition, London, February, 1907.

NATAL SECTION.

LIST OF AWARDS MADE BY THE EXECUTIVE COMMITTEE.

THE following is a list of the awards made by the Executive Committee of the South African Products Exhibition to exhibitors in the Natal Section. In no case were awards made for any of the Government exhibits or for minerals:—

	Silver Medals	Bronze Medals	Diplomas.
<i>Wool, Merino—</i>			
James Morton, Tweedie Hall	1	..	..
H. Walker, M.L.A., Highflats . . . . .	..	1	..
<i>Wool, Shropshire—</i>			
G. Richards, Mooi River . . . . .	..	..	1
<i>Tobacco and Cigars—</i>			
Natal Tobacco Plantations, Ltd.	1	..	..
W. Starr, Verulam . . . . .	..	1	..
W. Bunge, Murchison . . . . .	..	..	1
J. A. Freerks & Co., Durban . . . . .	..	..	1
Chetty & Co., Durban . . . . .	..	..	1
<i>Butter—</i>			
Natal Creamery, Ltd., Mooi River	1	..	..
Nel's Rust Dairy Co. . . . .	..	1	..
W. Moller, Marden Ash, Normandien . . . . .	..	..	1
<i>Cheese—</i>			
Norrish & Co., Maritzburg	1	..	..
<i>Oat Forage—</i>			
T. Braithwaite, Seven Oaks . . . . .	..	1	..
<i>Lucerne Hay—</i>			
D. C. Slatter, Weenen	1	..	..
<i>Grass Hay—</i>			
John Moon, Manderston . . . . .	..	1	..
<i>Mealies—</i>			
John Moon, Manderston	1	..	..
W. B. Bosse, Rosebank . . . . .	..	1	..
Archibald & Co., Durban . . . . .	..	..	1
<i>Kafir Corn—</i>			
R. Mason & Son, Maritzburg	1	..	..

	Silver Medals.	Bronze Medals.	Diplomas.
G. Carter & Co., Maritzburg . . . . .	..	1	..
G. Ross, Riversdale . . . . .	..	..	1
J. A. Peters, Maritzburg . . . . .	..	..	1
<i>Millet</i> —			
G. Carter & Co., Maritzburg . . . . .	..	..	1
R. Mason & Son, Maritzburg . . . . .	..	..	1
<i>Beans</i> —			
W. B. Bosse, Rosebank . . . . .	..	..	1
R. Mason & Son . . . . .	..	1	..
<i>Pens</i> —			
G. Carter & Co., Maritzburg . . . . .	..	1	..
J. A. Peters, Maritzburg . . . . .	..	..	1
<i>Rubber</i> —			
Messrs. Lepper & Pennington, Maritzburg	1	..	..
<i>Meal</i> —			
R. Mason & Co., Maritzburg	1	..	..
<i>Pineapples</i> —			
Natal Government, Winkel Spruit . . . . .	..	..	..
Natal Fruit Export Co., Durban	1	..	..
W. Thompson, Umkomaas . . . . .	..	1	..
<i>Plums</i> —			
Mrs. E. T. Mullens, Maritzburg . . . . .	..	1	..
<i>Jellies and Marmalade</i> —			
Mrs. P. H. Campbell, Chase Valley	1	..	..
Mrs. Turner, Maritzburg . . . . .	..	..	1
Mrs. Stayner, Cedara . . . . .	..	..	1
<i>Canned or Bottled Fruit (Trade)</i> —			
Messrs. Trotter & Co., Pinetown	1	..	..
<i>Condiments</i> —			
Mrs. Vincent Seymour, Malvern (Chutney)	1	..	..
Messrs. Trotter & Co. (Chutney and Curry Powder) . . . . .	..	..	1
Messrs. Bazley Bros., Barnesdale (Cayenne Pepper and Chillies) . . . . .	..	1	..
<i>Sugar</i> —			
Natal Estates, Ltd., Durban (<i>awarded Silver Gilt Medal</i>)			
J. L. Hulett & Sons, Durban . . . . .	..	..	1
E. W. Hawkesworth, Equeefa . . . . .	..	..	1
<i>Tea</i> —			
Bazley Bros., Barnesdale	1	..	..

	Silver Medals.	Bronze Medals.	Diplomas.
Aroma Tea Estate .. . . .	..	1	..
J. L. Hulett & Sons, Kearsney .. .	..	..	1
W. R. Hindson & Co., Clifton Tea Estate .. . . .	..	..	1
<i>Coffee—</i>			
Bazley Bros., Barnesdale Estate .. .	..	..	1
<i>Arrowroot—</i>			
Archibald & Co., Umzinto .. . . .	..	1	..
<i>Cotton—</i>			
W. Cato, Hillarys	1	..	..
D. C. Slatter, Weenen .. . . .	..	1	..
J. Kirkman, M.L.A., Esperanza .. .	..	..	1
D. E. Mitchell, Imbezana .. . . .	..	..	1
<i>Wattle Bark—</i>			
Estate H. von Bulow, Dalton	1	..	..
Holley Bros., Broadmoor .. . . .	..	1	..
Harden Heights Wattle Co., Ltd. .. .	..	..	1
Town Hill Wattle Co., Hilton Road ..	..	..	1
Mooi River Wattle Co. .. . . .	..	..	1
<i>Ostrich Feathers—</i>			
G. S. Keel, Impanza .. . . .	..	..	1
<i>Samp—</i>			
T. Lawes, Maritzburg .. . . .	..	..	1
<i>Manufactured Timber Goods—</i>			
Merryweather & Co., Maritzburg .. .	1	..	..
<i>Manufactured Leather Goods—</i>			
Lyle Bros., Maritzburg	1	..	..
<i>Manufactured Leather Goods and Basket Ware—</i>			
Trappists, Marianhill .. . . .	..	1	..
<i>Aloe Fibre—</i>			
South African Industrials, Ltd., Port Shepstone	1	..	..
Mr. Plows, Port Shepstone .. . . .	..	1	..
<i>Ramie Fibre—</i>			
J. Eglington, Maritzburg .. . . .	..	1	..
D. C. Slatter, Weenen .. . . .	..	..	1
<i>Silk—</i>			
G. I. W. Sim, Maritzburg .. . . .	..	1	..
<i>Publications—</i>			
P. Davis & Sons, Maritzburg .. . . .	..	1	..
<i>Scientific Books on South African Subjects—</i>			
T. R. Sim, Maritzburg .. . . .	..	..	1

	Silver Medals.	Bronze Medals.	Diplomas.
<i>Builders' Materials—</i>			
A. Oliff, M.L.A., Maritzburg (Bricks) ..	..	..	1
D. C. Aiken, Port Shepstone (Marble) ..	..	1	..
<i>Angora Skins—</i>			
G. Melville, Maritzburg .. . . . .	..	1	..
<i>Spirits—</i>			
A. Wilkinson, Ottawa Estate .. . . .	..	1	..
<i>Wines—</i>			
A. Dryden, Pinetown Bridge .. . . .	..	..	1
<i>Sweet Potatoes—</i>			
W. H. Goble, Clairmont .. . . . .	..	..	1
<i>Monkey Nuts—</i>			
Archibald & Co., Umzinto .. . . . .	..	..	1
<i>Collection of Kinds of Mealies, Sorghums, Beans, etc.—</i>			
Director Experimental Stations, Cedara ..	..	..	..
<i>Collection of Seeds—</i>			
R. Mason & Son, Maritzburg .. . . .	..	1	..
G. Carter & Co., Maritzburg .. . . .	..	..	1
<i>Collection of Native Manufactures, Curios, Horns, etc.—</i>			
A. Hughes, Maritzburg .. . . . .	..	1	..
<i>Leopard's Skin—</i>			
F. W. Shaw, New Hanover .. . . . .	..	..	1
<i>Bucks' Skins—</i>			
Hon. W. Deane, Sevenoaks .. . . . .	..	..	1
<i>Photographs and Lantern Slides—</i>			
W. Allerston, Maritzburg	1	..	..
J. Watkinson, Railway Photographer, Maritzburg .. . . . .	..	1	..
<i>Castor-Oil Beans—</i>			
W. Cato, Hillarys .. . . . .	..	..	1
<i>Lycopodium Plants—</i>			
Botanic Gardens, Maritzburg .. . . .	..	..	1
<i>Fish Scale Work—</i>			
Miss G. C. Anderson, Durban .. . . .	..	1	..
<i>Medicinal Products—</i>			
H. Illing, Ladysmith .. . . . .	..	..	1
	—	—	—
	20	28	39
	—	—	—

Experiment Farms.

CEDARA.

TO DIRECTOR EXPERIMENT STATIONS.—

The weather during July has been very cold and wintry throughout, but quite seasonable and much in keeping with that of the previous month. On 26 days frost was registered on the vlei, the mean minimum being 37 degs. Fahr. The lowest reading was 19 degs., and the mean maximum recorded was 68.74 degs. Frost was experienced on four days only on the hill; the mean maximum and minimum readings there were 71.41 degs. and 35.5 degs. respectively. The hill site for the thermometer is practically at the College, and the vlei one adjoins the spruit in close proximity to the main entrance of the Farm. The distance is well within a mile, but the variance of temperature from the high and low ground is very marked.

The work in general has been rather disjointed during the month owing to the students having each a fortnight's holiday. Arrangements were made that they should take it in turn so that as little interference to the work as possible might be caused. At the end of the month all had returned, and I am pleased to say with an additional eight students. Three were transferred to the Coast Farm at Winkel Spruit for a course there in tropical agriculture, while one is still at the Weenen Station.

On field work, ploughing has been carried on chiefly on the vlei so that the stiff soil may be rendered mellow and in good tilth for spring crops. Drainage has been occupying attention also. Drain pipes for the lateral drains have arrived, and it is hoped that a good many will be laid during the current month. There is no doubt whatever that the work entailed in reclaiming the vlei soil is fully warranted as it is undoubtedly the best soil on the Farm; and I should be very glad if it could be found convenient to allocate a good portion of it for the growing of lucerne to be available for the feeding of all stock.

The temperature returns, as will be seen, are exceptionally low this season; and I have no doubt it will be of interest to report on the condition of certain grasses grown on the vlei:—Tall Oat Grass (*Avena elatior*), Cocksfoot (*Dactylis glomerata*), Canada Blue Grass (*Poa compressa*), and Kentucky Blue Grass (*Poa pratensis*) have stood the frost well and are quite green, particularly the Tall Oat Grass, which has proved all along to be a good frost resister. *Paspalum dilatatum*, about which numerous enquiries are made, has not resisted the frost very well, but, of course, will make a very rapid start in spring.

The working stock are healthy. The heavy draught horses have

had rather an easy month, and are in very good condition. Six mules have been transferred from the Transport Department to be available in carting from the station the offal from the Government Abattoir. The poultry are doing well and now laying. The College has been supplied with a quantity of eggs and the incubators filled. We have now pens of Buff and Black Orpingtons, Silver Wyandottes, White Leghorns, Plymouth Rocks, White Minorcas and Indian Game, from which egg-laying records are being secured by means of trap-nests. The Persian sheep are doing very well, and are due to commence lambing about the end of the month. One Persian ram was sold at the Durban Show.

The Blacksmith, Carpenter, and Storeman are being fully occupied in their respective branches of work. The Carpenter had his annual leave in the early part of the month.

In order that the students may have tuition in bricklaying, a brick-layer attends and gives practical instruction 2 days a week.

An exhibit of winter foods, etc., and four Persian sheep were put on the Durban Show.

ALEXANDER REID,

Farm Manager.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

The weather for the month under review has been dry but warmer than the previous month, the effect of the change being very apparent on the various crops, which have made good growth; the earlier varieties of cereals are now beginning to pipe and look very promising.

The continuous work of irrigating one or other of the various crops has been attended to with little inconvenience, a good supply of water being always obtainable.

Nine varieties of tobacco seed have been received from the Central Farm, Cedara; and the first sowing of all varieties has been made in nursery beds. These are protected from the frost at night and sun in the daytime by scrim covered frames (size 3 feet 4 inches by 2 feet 4 inches), obtained from Messrs. Roff & Co., of Durban, for the modest sum of 4s. per dozen on rail. These are very convenient for any nursery work. Up to the present, nine applications for tobacco seed have been made by settlers, and these I have supplied with sufficient seed of one variety for a first sowing, and other parcels will be issued as occasion requires. One or two settlers have signified their intention of planting from five to ten acres with tobacco, so it would appear they do not intend allowing the grass to grow under their feet during the coming season.

The work of excavating the main drain across the lower end of the block is practically finished, and I shall furnish you with the measurements so that the pipes may be obtained in order to allow me to finish

this work at an early date, as the fast approaching summer will necessitate my putting the labour on to other work. Approximately 200 yards of drain have been excavated along and close to the eastern boundary fence, averaging 3 feet deep.

The farm buildings have been repaired where necessary, and all outside woodwork painted, the wall receiving a coat of limewash inside and out.

All live stock are healthy.

W. HOSKING,
Curator.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

The month of July has passed, leaving behind it a record number of signatures in the visitors' book since the inception of this Farm.

All hands have been extremely busy clearing land for orchard, erecting sheep and pig proof fences, trashing cane in readiness for cutting (which we hope to start about the 12th of August), transplanting of onions and rhubarb, and cutting and crushing cane for the Analyst (Mr. Parry), who has been here for a week taking the polariscope reading of the juice from the different manured and unmanured plots. These polariscope readings should prove very valuable to cane growers taken in conjunction with the results to be tabulated when the cane is cut, and should effectively determine the best and cheapest fertiliser to use for heaviest crops and best sugar contents.

Two students arrived from Cedara during the month and are taking a great interest in their work, giving entire satisfaction.

The correspondence in connection with the different crops grown on this farm is increasing rapidly, no less than 32 letters being received wanting fullest information *re* the growing of cane, maize, beans, arrow-root, peanuts, chicory and fibre. Great interest appears to be taken in the results of our distance of planting maize and detasseling of alternative rows. A great number of my correspondents are young farmers making a start in Zululand and on the North and South Coasts.

On the 30th of the month we had a splendid rain, 1.52 inches being recorded. This is the best rainfall for the past three years for July, and has helped us considerably with the turning over of new land for orchard, which is being pushed on with as fast as possible. The rain has also greatly assisted the young onions, over 7,000 of which were transplanted a few days beforehand.

There is an abundance of work for more than double the number of labourers now employed if we wish to have everything in readiness for the coming planting season. Several hundred yards of drainage are one of the most important items.

Several varieties of garden peas were planted in the last week of June and are making good growth.

Mostly all the beans are ready for picking and will be harvested early in August.

The pigs which were used for feeding experiments in open paddocks are now styed, and will finish off the experiments there on set rations, when they will be well fit for market.

W. JOHANSEN,
Manager.

CHICKEN POX.—One of the most common poultry ailments in Jamaica is what is known locally as “yaws”—called elsewhere chicken pox. A writer in the *Journal* of the Jamaica Agricultural Society gives some interesting notes on the disease. He points out that the chickens are allowed to sleep under the old hen, often in the old nest where they were hatched, or at any rate in the same spot, box or barrel every night without thought of cleaning that place. Thus they sit among their own droppings, often with the smell of foul droppings round them: sometimes they are closely shut up in a box or barrel to keep them from rats. The foul air poisons their blood and Nature attempts to throw off that poison through the eruptions characteristic of the disease. If the chickens were at once put under sanitary conditions these eruptions would soon break by the scratching of the chicken, and dry up without bleeding or eating into the flesh. But as the last thing that is thought of is at the root of the trouble and the poor chickens are looked upon as being very aggravating and inconsiderate to get sick, the eruptions spread and soon kill the little things miserably. It is suggested that the first thing to do is to provide a clean place for the chickens to sleep, and a little Jeyes' and water is also usually sprinkled under the hen's wings as her feathers are often saturated with the foul odour of excretions. Then dissolve two teaspoonfuls of Epsom salts in a pint of water and place this in a pan where the chickens must drink it—that is, let them have no other water. Do this three mornings in succession. Feed—rice, duck ants and worms instead of corn. Get 3d. worth of tincture of iodine and a camel hair brush—or, a feather will do: catch the chickens in the evening when they return one by one and touch the eruptions with the tincture. Do this three days also, and in that time the chickens should be better. The scales will drop off or can be rubbed off, leaving the flesh below clean. Tincture of iodine is said to be at once a safe, clean and effective application.

Gardening Notes for September.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

MAIN crops should now be sown for the following vegetables :—Dwarf Beans, Beet, Carrot, Cabbage, Cucumber, Egg plant, Leek, Lettuce, Mustard and Cress, Melon, Radish, Tomato, Vegetable Marrow, Squash, Capsicum and Chili. If required, this is also the best time to sow Asparagus, Globe Artichoke, Okra, Sweet Corn and Pop Corn. Jerusalem Artichokes should also be put in if not already planted.

The best varieties of Dwarf Beans for sowing now are Canadian Wonder, Golden Butter, Rustless Wax, and Henderson's Bush Lima. Plant about two inches deep in drills from 18 inches to 2 feet apart.

The Climbing or Pole Beans should now be sown. Three good varieties are the well-known Scarlet Runner, Mont d'or Wax podded, and Henderson's early Leviathan Lima.

Cucumbers, Marrows, Melons, and Squashes should be planted on small mounds about 4 feet apart each way.

Remove a few spadeful of soil and fill in with a mixture of good and rotten dung, forming little hillocks above the surrounding level. On these plants two or three seeds or young plants. Allow several plants to grow on each hill till strong enough to resist attacks of grubs, then thin out to one plant, leaving the strongest. If the grub is troublesome dust the surface round each plant with lime.

All the varieties of Squash may be sown now. Two of the best are Heart o' Gold and Delicata. Heart o' Gold yields large orange red fruits averaging 25 to 30 lbs. each, fine grained, golden red flesh, dry and sweet. The Delicata is small but exceedingly prolific, dry and sweet, and surpassingly rich in flavour.

Sow Sweet Corn and Pop Corn in rows three or four feet apart and one foot in the rows. The plants should be hoed when about a foot high. The Pop Corn is a favourite sweet in America. Allow the cobs to ripen thoroughly and then roast the grain in a closed iron vessel until they "pop," shaking the vessel meantime. This is produced by the explosion of the gas in the grain expanded by the heat. The "Pop Corn" is then taken out and slightly dusted with flour sugar, when they form a delicious sweet. Sow round Spinach for summer use; also the Spinach Beet. With this variety a constant supply is kept up throughout the summer.

Onions may be planted out now from the autumn-sown beds into a deep, rich soil, with the addition of a little lime or a good dressing of wood ashes.

Asparagus beds may be made this month, and seed should be sown now for planting out next spring. Sow in drills a foot apart, keep carefully hoed and free from weeds. The soil for the permanent beds should be heavily manured and trenched to the depth of a foot. Plant in rows three feet apart and one foot between the plants in the rows, spread the roots well out, and let the crown of the plant be set deep enough so that it will be covered from four to six inches. Give old beds a top dressing with salt or Nitrate of Soda.

FLOWER GARDEN.

In the midland districts all varieties of Tender and Half-hardy flower seeds may now be sown, such as Aster, Amaranthus, Aconitum, Balsam, Calandrinia, *Celosia plumosa*, *Celosia cristata* or Cockscomb, Chrysanthemum tricolor, Cosmos, Dahlia, Ornamental Gourds, Helichrysum, Heliosis, African and French Marigold, Nasturtium, Portulaca, Sensitive plants, Sunflower, Zinnia, etc.

Climbers.—The following climbers may easily be grown from seed sown this month:—Aristolochia, Clitoria, Cissampelos scandens, Convolvulus, Eccremocarpus, Luffa or Sponge Gourd, Ipomeas of various kinds, Lophospermum, Mandevilla, Maurandya, *Mina lobata*, and Physianthus.

Sow in boxes or pots under glass Coleus, Gesneria, Gloxinia, Heliotrope, Impatiens or Zanzibar Balsams, Musk, and double Petunia.

In the up-country districts hardy flower seeds may now be sown, such as Candytuft, Antirrhinum, Calendula, Coreopsis, Cornflower, Dianthus, Gaillardia, Larkspur, Petunia, Phlox; also Poppy, including the Giant Oriental and Shirley.

Plant out Bulbs of the various kinds of Lily, including *Lilium lancifolium* Album (white), *roseum* (pink), and *rubrum* (red), *Lilium tigrinum* (double and single), *Lilium umbellatum*, and *Lilium Wallacei*; also the beautiful *Triglochin pavonia*, the Belladonna Lily, Maltese Lily, Scarboro' Lily, Day Lily (*Hemerocallis*), and Gladiolus. The Gladiolus will thrive in any good garden soil, but the bulbs must be planted not less than five inches deep in light soils and about four inches deep in heavy soils. They are very effective when planted in clumps of five or six in a clump.

Plant out Cannas, Dahlias, Perennial Phlox, Pentstemons, Abutilons, Camellias, Magnolias, Gardenias, *Hibiscus sinensis*, Oleanders and other evergreen flowering shrubs, also evergreen Creepers.

From 3,000,000 to 5,000,000 gallons of oil are annually made in the United States from mealies. The oil is used to some extent for culinary purposes, and also for lubrication and in the mixing of paint.

Correspondence.

CITRUS FRUIT CULTURE.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

DEAR SIR,—In your June number a letter appeared above the signature of Mr. G. C. Williams, appreciative of the value of Masters' system of Citrus culture. As an old and intimate friend of Mr. Masters, the following particulars will, I trust, prove interesting to your many readers.

The system he has developed is the result of many years of careful study and exhaustive experiment at considerable cost; and, being a former resident in the Cape Colony, he naturally offered his system and services to that Government—the system to be used as a secret method—but the offer was declined. He was then informed that if he took it to America he could get anything he wanted for it, either in cash to purchase it outright, or money and scope to work it, with participation in the results. His reply to this was that he had been resident in South Africa for 26 years; if his country could not afford to compensate him for his experimental losses or provide him with an opportunity of benefitting it by his knowledge, he would give it them as a present to induce belief.

Simultaneously he pointed out that, if South Africa refused to credit his knowledge and South America or men of intellect and capital in other parts of the world did appraise it at its true value, then his objective in publishing it—which was to benefit South Africa—would be lost, once again fulfilling the old adage that it is seldom a prophet is recognised in his own country. Even now I understand that a few of his points have been ascertained and are being secretly tested in other parts of the world, possibly for commercial advantage and to gain notoriety.

The system is not one for any one South Africa Colony to monopolise on its own behalf to the exclusion of the others, but should be carried out for the benefit of the whole of South Africa in its widest commercial sense. It will work in with agricultural co-operation and fruit exportation, the two matters our present Minister of Agriculture takes such an interest in, but, as Mr. Masters points out in his treatise, a matter that is left for everyone to do generally remains undone.

I think with Mr. Williams that Natal should take the initiative, for when Mr. Masters was round in Natal he thought very highly of its possibilities for the exportation of fruit, but saw that this enterprise lacked organisation and needed direction. I also saw his summary of Natal's possibilities as compared with the Grahamstown portion of the

Cape Colony, which was taken over by the Natal papers at the time. One thing I am certain of is that, if the South African Governments do not try to secure Mr. Masters' services, other countries will. His book is as yet unknown, seeing the last instalment was only published in the *Cape Agricultural Journal* in June last.—Yours, etc.,

A. A. OSBORN.

The Mount, Newcastle,

14th August, 1907.

PRESIDENT SLACHTER STRAWBERRIES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

Sir,—Having read the Orchardist's report on Strawberry culture at Cedara, in which he states he has not had a single favourable report from anyone supplied with plants of the variety "President Slachter," we feel it our duty to that Department to make known our experience.

We received some plants of this variety from Cedara in 1905, which we have established in these gardens; and although we have no data as to weight, quantity, etc., I have no hesitation in saying that "President Slachter" is far and away the best strawberry we have grown here yet. The plant is vigorous, a good cropper, fruit large, and of good form, and, what we consider of first importance, is firm and a fine colour.

I may say that we grow strawberries under difficulty, inasmuch as we have to protect the plants from white ants, but we have overcome this difficulty by constructing raised beds. We are looking forward to much better results than we have had yet; and we feel indebted to the Cedara Experiment Farm for the possession of a very useful strawberry.

Trusting you will find space in your *Journal* for this letter.—I am, etc.,

E. PATTEN,

Gardener to Sir B. W. Greenacre.

Musgrave Road, Durban.

MEALIE GRUB.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

Sir,—I should like to know the best means of eradicating the common grub that attacks the mealie crop in its various stages.

The grub I refer to, is, when full grown, about 1 or 1½ inches long, of a brownish blue or slate colour, and is very destructive to the young plant, simply cutting it off at the surface of the ground.

This grub (if the same) again appears in the top pith of the mealie stalk when the stalk is from 3 to 5 inches high, apparently having hatched in the soil and again settled near the top of the mealie stalk, where it

develops, as it works its way down the centre of the stalk, again entering the ground, I presume. It is also found in the mealie cob, where it bores along, causing great destruction to the grain. Thanking you in anticipation.—I am, etc.,

JOHN HARPER.

Highilats, Ixopo.

[Our correspondent is confusing two distinct insects. The first one he refers to is what is known as the "cutworm;" the second is the "top-worm." Full information regarding the various grubs or moth caterpillars which attack mealies in Natal was published in the February, 1904, issue of the *Journal*, in Mr. Fuller's series of "Letter Book Pages."]

A method of saving tobacco seed by means of "night-caps" is gaining headway in New England, Florida, and is being adopted in parts of Pennsylvania, New York, and Ohio, U.S.A. Just before blossoming a paper bag is placed over the buds, thus preventing cross-pollinisation. After the seed pods have matured the bags may be removed.

In 1906 India produced 240,849,894 lbs. of tea, of which 438,628 lbs. were grown in Burma. 162,468,034 lbs. in Assam, 60,134,577 lbs. in Bengal, and the remainder in other parts of India. In 1905 the total production was 221,488,139 lbs. In 1906 there were 529,995 acres under cultivation, as compared with 527,290 acres in the previous year. The total export of Indian tea during the year ended 31st March, 1907, by sea (including coastwise trade), was 234,431,815 lbs.; and by land, 2,299,808 lbs.; making a grand total of 236,731,623 lbs. The grand total for the year ended 31st March, 1906, was 217,297,452 lbs.

In an article appearing in the *Board of Trade Journal* on the foreign trade and shipping of China in 1906, based on the "Abstract of Statistics and Report on the Foreign Trade of China" for 1906, recently published by order of the Inspector-General of the Chinese Imperial Customs, it is stated that the exports of fibres show in general a steady increase, although the export from a country like China is "absurdly small." Hemp, jute, and ramie all increased in quantity, the export of jute being more than doubled. It is probable, it is stated, that much which, for taxing purposes, has been classified as hemp, is actually ramie.

Animal Diseases in July.

THE POSITION OF EAST COAST FEVER.

REPORTING to the Minister of Agriculture on the position of East Coast Fever during the month of July, Mr. Woollatt, Principal Veterinary Surgeon, states that 15 outbreaks of the disease occurred during the month as follows:—Vryheid and Ngotshe, 8; Paulpietersburg, 4; Durban County, 2; and Utrecht, 1. The following deaths were reported:—Vryheid and Ngotshe, 600; Paulpietersburg, 44; Dundee and Umsinga, 205; Durban County, 66; Klip River, 26; Muden, 13; Umvoti County, 9; Lower Tugela and Mapumulo, 652; Zululand, unknown—making a total, exclusive of Zululand (for which no record is kept), of 1,615 deaths.

With regard to the outbreak of East Coast Fever in the Utrecht district, which occurred at the end of the month, Mr. Woollatt says that his Department has, so far, been unable to satisfactorily determine the source of infection. The farm "Langerswacht," on which the outbreak appears to have first made itself apparent, is really in the Magisterial division of Vryheid, but for quarantine purposes it was included in the Utrecht district about July of last year. Regarding the movement of cattle to this locality, the only information Mr. Woollatt has been able to obtain so far, is that, about the 10th of May, 1906, some cattle were taken on to the farm "Langerswacht" (then in the Vryheid division), which had come from the vicinity of the Ngotshe border, but which had been running on Lancaster Hill, near Vryheid, some time previous to going on to "Langerswacht." Three are said to have died on the latter farm within a month after their arrival there. The next death, as far as can be ascertained, occurred in August. In February two more head died in this locality, another in March, another in April, and a further one in June, and then three died in August, which are known to be from East Coast Fever. No information is forthcoming as to the actual cause of death amongst the isolated cases which died prior to August. These deaths were not reported.

In September or October a span of oxen was brought on to the farm, which had been working in the Mapumulo district; but these oxen were quarantined prior to being allowed to return, and the owner of the farm is positive that no deaths occurred amongst them after their return. The oxen did not belong to him.

Mr. Woollatt draws attention to the fact that the cattle brought there from the Vryheid district came some 18 months before East Coast Fever was known to exist there; and, although there is a certain amount of evidence pointing to these animals being the possible source of infection, Mr. Woollatt thinks, nevertheless, that it must be assumed that, had East

Coast Fever been introduced into this locality in May, 1906, the disease would have made itself much more evident during the past summer: and he is strongly of opinion, from the knowledge we have of the disease, and the life history of the ticks which are responsible for its dissemination, that, if the truth of the matter could be got at, it would be found that the infection was brought there probably about the month of March, April or May. There is no case on record (so far as Natal is concerned) where infection has been introduced during the winter, and has lain dormant, so to speak, during the whole of the summer months, for even if it be admitted that the three head of cattle which died prior to June, 1906, died of East Coast Fever, yet such a small mortality almost warrants the assumption that the disease was dormant if it existed then.

In connection with this outbreak, we are fortunate, Mr. Woollatt remarks, in having, on the Utrecht side, a farm fenced on each side, with no cattle on it, and there is, therefore, a zone already established, free of cattle, doubly fenced. It is also fortunate the outbreak made itself evident before the fence which is being erected between the Utrecht and Vryheid districts, was completed in this locality. The fence has, in consequence, been diverted to include the infected farms; and it is also possible to make use of the existing fences already referred to, some twenty miles of fencing being thereby saved.

The boundary of cattle on the infected and in-contact farms has been completed. There are some 480 head of cattle on the infected farms.

In the Vryheid district the branding of cattle is being proceeded with, also in the Ladysmith district on the east side of the main line of railway.

During the month the cattle on the actually infected area on the Weenen side of the Mooi River at Muden, were purchased by the Government and slaughtered, the owners voluntarily selling their cattle. This is also being carried out on a limited scale on the Umvoti side of the same area, the cattle being slaughtered within the quarantined area, and the meat conveyed by mule-wagon to the railway. A considerable number of cattle have yet, of course, Mr. Woollatt remarks, to be taken over before it can be said that this area has been dealt with by the stamping-out process in a satisfactory manner.

The purchase of cattle in the several infected areas for slaughter purposes was continued during the month on the same scale as before, which necessitates a considerable amount of work on the part of the Veterinary Department in seeing that these cattle are properly conducted to the railway, etc. Consistent, with safety, this buying of cattle should be facilitated as much as practicable, as it enables the owner to realise on his stock, and reduces the number of cattle in the districts, which will make it easier for the Department to deal with them when the stamping-out policy is resorted to.

"The Committees appointed in the several districts in connection with East Coast Fever have rendered valuable assistance and help to the Department," Mr. Woollatt says, "particularly in those districts where the disease is prevalent."

OTHER DISEASES.

Lungsickness.—No fresh outbreaks occurred during the month.

Sheep Scab.—During the month, Mr. Woollatt reports, there were 33 fresh outbreaks, and 18 licenses were raised.

Quarter-evil.—D.V.S. Vernéy (Mooi River) states, in his report to the P.V. Surgeon, that this disease has been exceedingly prevalent during this winter, especially in the Thorn veld. During the month 70 deaths took place in the Weenen Division, chiefly amongst Natives' cattle. Several deaths also occurred in the Ingogo district. The farmers in whose herds the deaths occurred have all inoculated their cattle, and there have been no further deaths since the middle of July.

Crop Reports for July.

EVERY effort is being made to increase the Department's circle of honorary crop correspondents; and, although the number of reports which have been received during the month is only a quarter of that which it is hoped will be forthcoming a month or two hence, it is nevertheless sufficiently large to enable readers of the *Journal* to be presented with some idea of the general crop and other conditions prevailing in certain parts of the country during the month of July.

So far as our reports go, the rainfall has been, speaking generally, nominal for the time of the year, though in some districts it has been above the average. In the south of the Colony, and in the Eshowe district of Zululand the rainfall has been good, but our Darnall (Victoria County) correspondent reports that in his District the rainfall during July was insufficient. Northwards of Port Shepstone (where the fall was good), in the districts of Polela, Richmond, Nel's Rust, Riet Vlei, etc., a sufficiency of rains fell, in some districts the fall being above the normal for the time of the year. These beneficial conditions seem to have been experienced eastwards, as well, running towards Greytown. As far as can be seen, in the upland districts of the Colony—that is to say, in the third belt—there has been little or no rain. There were one or two slight showers in the vicinity of Glencoe, and in the Newcastle district slight misty rain was experienced for a short while on the high land.

More or less severe frosts have been experienced in most parts of

the country, even on the North Coast, where a little damage was done during July to banana plants. Since the middle of July, however, the severity of the frosts, so far as the midland and coast belts are concerned, has abated, but in the northern districts they have continued more or less severe. As far as can be ascertained, little damage was done to crops by frosts during the month.

Contrary to original expectations, the mealie crop has not turned out to be such a record one as it gave promise of doing early in the year. In most parts of the Colony the crop has been reaped; and whilst in some districts—as, for instance, Port Shepstone, Riet Vlei, Greytown, St. Augustine's, Laing's Nek, etc.—the results have been good (some being much above the average, in other districts the yield has been low and not at all up to anticipation. In the majority of the districts the mabele crop is fairly good, and a yield above the average is promised. On the whole, the potato crop has not turned out a good one. In some districts—as, for instance, Greytown and Glencoe—complaints are forthcoming that the potatoes dug are of small size, owing, it is stated, to a fungus disease of the tops. Our Port Shepstone correspondent states that the sugar cane crop is a better one than was expected, owing to recent rains, but that it is still not a good one. Our correspondent at Umbizana writes that *Furcræa* is still being planted in that locality. In the Reit Vlei district mangolds, which are usually a good standing crop, are reported to be decaying, probably owing, it is stated, to sudden severe frosts on luxuriant autumn growth. The season for citrus fruits is apparently a good one, and bananas and pineapples are also doing well. Prices, however, have been low.

The market for cattle is still, of course, greatly affected by East Coast Fever; and in most parts of the Colony prices are very low or there are no sales effected at all. Reports from Nel's Rust, Glencoe and Newcastle, however, indicate a better state of things in those districts. Prices for cattle in the Glencoe district are advancing. In the Newcastle district the market is improving, buyers offering 30s. per 100 lbs. dead weight during July. In the vicinity of Port Shepstone, too, slaughter oxen have been sold at good prices. Prices for eggs and poultry, and butter and milk have, on the whole, been moderate. In some of the northern districts of the Colony the prices of butter and milk have been, of course, affected by East Coast Fever. In two or three districts—Newcastle and Vryheid, for instance—no locally produced milk has been sold. Supplies for Vryheid have been obtained from Mooi River and elsewhere. In the Glencoe district prices of milk and butter were about the same in July as last year: East Coast Fever having no apparent effect so far.

Our St. Augustine's correspondent reports that the Nqutu farms lately allotted are being actively occupied; and hay-making, orchard-planting, and building are in full progress.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg, and other South African markets during the month of July-August, have averaged as follows:—

NATAL.

PIETERMARITZBURG.—The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Fowls, 1s 9d; ducks, 2s; turkeys, cocks 9s, hens 5s; guinea fowls, 2s 6d.

Animal Produce.—Butter, 1s 6d per lb; eggs, 1s per doz.; pork, 5d per lb; bacon, 6d per lb; ham, 9d per lb; lard, 7d per lb; hides, 7d per lb; honey, 6d per lb.

Vegetable Produce.—Buckwheat, 12s per muid; beans, 18s per muid; earth nuts, 10s per muid; millet (grain), 10s per muid; hay, £1 10s per ton; Kafir corn, 10s per muid; mealies, 7s per muid; potatoes, 6s per muid; sweet potatoes, 3s per muid; peas, 18s per muid; sunflower seeds, 6s 6d per muid; barley, £2 10s per ton; oats, £2 per ton; bananas, 1s per 100; papaws, 3s per dozen; pineapples, 1s per dozen.

DURBAN.—The Market Master reports the following average prices realised on the Durban market during the month ended 15th August:—

Live Stock.—Sucking pigs, 4s; fowls, 2s; ducks, 2s 9d; turkeys, 8s 6d; guinea fowls, 3s 9d; rabbits, 8d.

Animal Produce.—Bacon, 7d per lb; eggs, 1s 2d per dozen; butter, 1s 5d per lb; pork, 4d per lb; honey, 6d per lb.

Vegetable Produce.—Kafir corn, 9s per muid; mealies, 7s 6d per muid; potatoes, 10s 6d per muid; sweet potatoes, 2s 6d per muid; turnips, £2 5s per ton; bananas, 9d per 100; naartjes, 1s per 100; oranges, 9d per 100.

TRANSVAAAL.

Messrs. Lotter & Co., commercial brokers and commission agents, P.O. Box 2000, Johannesburg, report regarding prices realised on the Johannesburg market during the week ended 15th August:—

Live Stock.—Oxen (slaughter), £10 10s to £13 10s; oxen (dressed), per 100 lbs, £1 17s 6d to £1 18s 6d; pigs, per lb, live weight, 3d to 3½d; pigs, each, £1 2s to £4 10s; sheep (slaughter lamels), 18s to 21s 6d; sheep (dressed), per lb, 5½d to 5¾d; fowls, 1s 6d to 3s; ducks, 2s 6d to 4s; guinea fowls, 3s 6d to 5s per brace; geese, 4s 9d to 6s 9d each; hares, 1s to 2s; turkeys, cocks (young) 7s to 10s, hens (young) 4s 9d to 6s.

Animal Produce.—Butter, 1s to 1s 3d per lb; eggs, new laid 2s to 2s 3d, fresh 1s 3d to 1s 6d per dozen.

Colonial 8s 6d to 10s, mixed 7s to 9s; mealie meal: O.R.C. 9s 6d to 11s per 183 lb, white 10s to 11s 6d; Cape oats, 11s 6d to 12s per bag; lucerne hay, 4s 6d to 5s per 100 lbs; onions, 5s to 8s per bag; potatoes, 4s to 12s; wheat, 17s to 20s per bag; naartjes, 2s to 4s 6d per 100; oranges, 2s to 4s 6d per 100; pineapples, 1s 6d to 2s 6d per doz.

ORANGE RIVER COLONY.

BLOEMFONTEIN.

The following prices realised on the Bloemfontein market appeared in the Bloemfontein *Post* of the 13th August:—

Live Stock and Animal Produce.—Fowls, 2s to 2s 6d each; ducks, 2s 6d to 3s each; turkeys, 4s to 8s each; hares, 1s to 1s 6d each; fresh eggs, 1s to 1s 2d per doz; butter, 1s 3d to 2s per lb; mutton: per hind quarter 4s to 5s 6d, per fore quarter 2s 6d to 3s; pork, 4d to 6d per lb; beef, 4d to 6d per lb.

Vegetable Produce.—Chaff, 4s 9d to 5s per 100lb; Kafir corn, 10s per bag; mealies, 7s 6d to 8s 3d per bag; onions, 5s to 9s per bag; potatoes, 5s to 10s per bag; naartjes, 3s to 4s per 100; oranges, 3s to 4s 6d per 100; pineapples, 1s 9d to 2s per doz.

The Bloemfontein correspondent of *S.A. Trade Journal*, writing with regard to the O.R.C. mealie crop, says:—"Owing to the tremendous crops of mealies, the price is expected by some to go as low as 4s to 5s per bag."

HARRISMITH.

The following prices for produce were realised on the Harrismith market on the 14th August:—

Live Stock and Animal Produce.—Ducks, 1s 6d to 2s; fowls, 1s 6d to 2s 3d; pigeons, 6d to 9d (each); turkeys: cocks 6s to 6s 6d, hens 3s 6d to 4s 3d.

Vegetable Produce.—Forage, 6s to 8s 6d per 100 lbs; mealies, 6s 3d to 6s 9d per bag; oats, 7s to 9s per bag; potatoes, 8s to 10s per bag; bananas, 1s to 2s per 100; oranges, 2s to 5s per 100; pines, 1s 6d to 2s per doz.

A number of small glass butter churns, supplied by a Nova Scotia firm, have been under trial for about twelve months by various people in Barbados, and they are reported to be "most convenient and effective." The churns are supplied in four sizes, from 1 quart to 4 quarts, by Messrs. Crump & Perrier, 25, Barrington Street, Halifax, Nova Scotia.

The Oversea Maize Market.

THE POSITION IN JULY.

THE following information regarding the oversea maize market has been compiled from *Beerholm's Evening Corn Trade List*.

Notwithstanding the large shipments of maize to Europe (2,685,000 qrs. during the three weeks ended 5th July, including 1,640,000 qrs. to Continental ports, as compared with 1,450,000 qrs., including 835,000 qrs. for the Continent, last year) the market showed more firmness, partly in sympathy with the upward movement in wheat and partly owing to the continued active Continental demand, which is, indeed, the feature of the season. Up to 23/10½ per 492 lbs. was paid for Gal/Fox steamer, shipment by 15th August, 23/6 for La Plata loading, and 23/4½ for a steamer well on the way. From Roumania and the south-east of Europe generally the reports regarding the growing crops continued favourable on the whole, but the American crop did not appear to have had a very favourable start. During the week ended 5th July, Argentina was still shipping only relatively moderate quantities.

During the following week shipments were again very large, although rather smaller than in the previous week. The cargo market continued firm up to Monday, 8th July, and prices advanced 8d. per qr., a fair number of cargoes changing hands on Friday, Saturday and Monday, but the market then became quieter, but became quite firm again on Thursday, with an improved demand; the top prices paid were 24/3 for Foxanian, August shipment, 23/9 for Yellow La Plata afloat, and 23/10½ for August/September shipment. Parcels closed rather easier, 23/10½ having been accepted for Odessa loading, after 24/- had been paid. During the week in question Roumanian crop reports were still favourable on the whole. The prospects of the American crop were for one of 2,650,000,000 bushels, against last year's actual yield of 2,927,416,000 bushels. The Argentine shipments that week were rather smaller, amounting to 171,500 qrs., making the total to the 12th July 1,444,500 qrs., against 3,522,000 qrs. in the same time last year, and 2,940,000 qrs. in 1905.

The *Corn Trade List* of the 26th July announced that the maize market had at last been "decidedly affected by the record shipments both to the United Kingdom and Continent." Prices declined during the week ended 26th July sixpence to a shilling per quarter. As low as 22/9 had been accepted for La Plata steamer afloat and 23/- for 15th August/September shipment, whilst Dar/Gal/Fox steamer afloat sold at

22/7½ per 480 lbs. Since June 1st (seven weeks) the shipments, especially from Roumania and Russia, had been "truly prodigious enough to try any market." "It is not easy to suggest when the shipment from Roumania and Russia will show any decided falling off," comments the *List* of the same date, "but it is a fact that about eight million quarters have already been shipped since last September, whilst the surplus has been estimated at about 13 to 14 million qrs. American shipments are fair for the time of year, being doubtless attracted by the relatively high prices, but the new crop is by no means in such a favourable condition as in either of the three previous years, although this week's cables denote some improvement." From Argentina less than half of last year's rate of exports since May 1st had, so far, been witnessed, but fairly liberal quantities were being moved that week, and the visible supply was equal to that of last year, viz., 80,000 tons. According to a cable to the *Corn Trade List*, however, the quality and condition of the supplies were very variable, thus hampering business.

The general statistical position carried up to date (26th July) was as follows:—

		1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	...	990,000	1,020,000	1,025,000
" " Cont.	...	1,630,000	1,290,000	1,060,000
Imports into U.K. for the 29 weeks ending				
July 20	...	6,385,000	6,101,750	5,808,500
Visible supply in U.S. (<i>Bradstreet's</i>)		1,877,600	1,346,000	1,248,700
		1906-7	1905-6	1904-5
American crop	...	340,000,000	316,000,000	285,000,000
		1907.	1906.	1905
New York, Spot	...	61c	58½c	62½c
Mark Lane, Mxd. Am. ex-ship	...	23 6	22 ⅓	23 9

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America ...	2,804,000	3,297,000	3,201,000	5,082,000	3,335,000	4,587,000
Argentina ...	1,469,000	1,015,000	2,788,000	2,271,000	2,802,000	1,696,000
Russia ...	1,025,000	1,489,000	123,000	153,000	166,000	374,000
Danube, etc.	1,487,000	2,784,000	203,000	839,000	122,000	133,000
Total ...	6,785,000	8,585,000	6,315,000	8,345,000	6,425,000	6,790,000

* Includes shipments for orders.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of July, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons. Cwt.
Natal Navigation ..	30	74	220	19	248	225	—	—	—	23,336 19
Elandslaagte ..	14	21	268	17	180	400	2	4	2	16,909 8
Dundee Coal Co. ..	11	10	194	9	80	293	4	11	14	15,244 6
Glencoe, Natal ..	13	98	89	11	477	14	—	—	—	15,145 10
Natal Cambrian ..	12	37	134	8	205	81	3	4	2	12,021 4
South African ..	10	11	95	11	225	50	5	29	51	10,428 7
St. George's ..	16	115	122	12	186	109	2	8	—	10,169 0
Durban Navigation ..	20	119	43	19	233	38	—	—	—	9,164 0
Newcastle ..	8	42	22	6	280	2	2	6	—	7,304 14
Natal Steam Coal Co. ..	1	48	4	2	160	2	1	4	1	3,239 15
West Lennoxton ..	5	1	65	2	9	97	—	—	—	2,975 0
Central ..	4	6	11	6	230	9	—	2	—	2,644 14
Ramsay ..	2	12	35	5	25	100	3	5	8	2,480 14
Talana (Natal) ..	2	10	13	2	26	30	2	3	6	951 10
Woodlands ..	2	8	4	1	9	5	—	—	—	253 0
Vryheid ..	1	3	—	1	4	—	—	—	—	32 0
Dumbi Mountain† ..	2	2	—	—	—	—	—	—	—	6 0
Signal Hill ..	—	—	—	—	—	—	1	1	—	5 0
Vaal Bank§ ..	—	—	—	—	5	—	—	5	—	5 0
Totals	153	671	1,310	122	2,702	1,515	24	82	84	132,376 10
Corresponding month, '06	140	654	1,221	120	2,309	1,525	51	217	229	92, 07 9

* Cost charged to Capital Account.

† Includes June Return.

§ June Return.

Maritzburg,
7th August, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of July, 1907 :—

	Tons.	Cwt.
Bunker Coal* ..	64,955	10
Exported to :—		
East London ..	1,444	5
Port St. John's ..	1	0
Algoa Bay ..	2,940	1
Mosel Bay ..	504	12
Cape Town ..	16,561	1
Total ..	86,406	9

* Including H.M. Warships.

Custom House, Port Natal,
1st August, 1907.

W. L. HOWE,
for Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	Ingenga .. P. Nicholson .. H. Bowes .. Mabela .. J. Pepworth .. D. Sparks .. W. Wright .. G. J. McDon'ing .. W. Anderson .. Jimze .. Kantool Zuma .. E. Moreland .. Mapelwana .. J. C. Buys .. W. M. Buys .. Makantangwa .. J. J. Geldenhuys .. F. Colling .. F. T. Hyde .. I. J. M. Buys .. Talwani .. J. Stevens .. H. O. Hyde .. Amangayehlezyo .. Halangana .. L. Nene .. L. Rheunga .. T. Nxumalo .. Mkungeni .. A. Mbala .. Vinuv e Libuma .. Luhienta Ka etc. .. Soishata Ka .. Strinera Ka Yabya .. Liyo Ka Norhayi .. Komana Ka .. Makaskela .. Hlanganiza Ka si i .. Ngcogcoya Ka Pepa .. J. A. Stone .. T. de C. Arbuckle .. B. Phipson .. M. Fraser .. R. C. Gold .. J. R. Royston .. J. van Whye .. F. A. Hathorn .. T. Palfman .. H. J. Hattig .. J. J. B. Cooke .. Sclander Bros. .. H. L. Frances .. Bacon & Kelly .. J. van der Merwe .. R. J. du Bois .. J. W. de Brayn .. C. M. Vermaak .. L. W. Meyer .. A. L. Jansen .. J. O. Nel .. A. C. Vermaak .. T. C. Vermaak .. H. Vermaak .. P. J. & H. J. Jordaan .. P. Mshabi .. G. ga and others .. Wade Bro. .. H. Whysall ..	Roodepoort Nicholson's Nek Zaarfontein Roodepoort Eenvogel Vlei Berg View Maggiesdale Waterford Netherby Rossboom Ruit Kuil Roodepoort Ruit Kuil Rossboom Blauw Bank Klipdal Himsley Ruit kuil Twijffaar Schoemansdal Allen Park Mangene Nqutu Dakla Macebo Jooseni Blood River Nkandl Magala No dweni Tiliz Hill Mapaswaneni Sinyela Nigasini Kerridge Strathcampbell Winterhoek Woo end Greenend Silburn Sau. uana Slogoma Servitude Estcourt Kelvia Rietfontein Winterton Excelsior Giba Roofontein Paddock Langverwacht Strathearn Eaunsciffe Sigtua Harriotdale Paddock Pestweek West Port Carolina Stanton Grantham
J. R. Cooper	Nkandhla & Nqutu			
S. A. Brown	Underberg			
A. B. Koe	Portion of Estcourt			
A. J. Marshall	Dundee			

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—continued.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
E. Varty ..	Western Umvoti ..	Scab	W. J. Slatter ..	H. J. M. Lacy
J. J. Hodson ..	Ptn of Lion's River	"	C. A. Charlwood ..	Craigieburn
R. Mayne ..	Krantzkop ..	Lungsickness	R. Spiers ..	Myeni
		"	Maqamangase ..	Loots Hoek
		"	Uqupu ..	Myoniezwe's Locat'n
		"	Ndabane ..	"
		"	S. Johnson & Co. ..	Inadie Store
		"	Ndabane ..	Myoniezwe's Locat'n
		"	Natives ..	Myoniezwe's Locat'n
		Scab	H. L. van Rooyen ..	Krantzkop
A. H. Ball ..	Weenen ..	"	S. C. Van Rooyen ..	Smal Hoek
		"	E. E. Robinson ..	Mona
		"	L. C. Kinsman ..	Mount Moriah
		"	Deya ..	Lilyfontein
		"	Vunyo and others ..	Elena Berg
G. Daniell ..	Vryheid ..	"	Gundane ..	Gretna Green
		"	Nkanyeze ..	Mooiplaais
		"	Hlabalan ..	Nootgedacht
		"	P. H. Tredoux ..	Bellvue
		"	Myamana ..	Weltevrede
		"	D. C. etzee ..	Doornhoek
		"	Mabekashen ..	Nootverwacht
		"	Funawayo ..	Nootgedacht
		"	J. V. Grening ..	Hartebeestelaagte
		"	Maboshwa ..	Onverwacht
		"	Moolie ..	Beaufort
		"	Mpundhla ..	Onverwacht
		"	B. Balladon ..	Schaapkopje
		"	Zimbata ..	Nootgedacht
R. Mayne ..	Eastern Umvoti ..	Lungsickness	C. van Rooyen ..	Boschfontein
		Scab	Nkabi and others ..	Loots Hoek
		"	P. R. Botha ..	O. I. fontein
		"	J. A. Nel ..	Oakland
		"	F. W. Spencer ..	Impanza
		"	J. Oliver ..	Greytown Town Lds.
		"	G. J. Mari'z ..	Fair View
J. Burton ..	Portion of Estcourt	"	Jim ..	Rensburg Spruit
		"	C. C. B. shoff ..	Waterhoek
		"	W. McFie ..	town Lands
E. Parkin on ..	New Hanover ..	"	Ndabeni and Jim ..	Locat on
		"	H. Portmann ..	Strijdgewon
		"	Madigezela ..	Location
		"	Chief Gwaimana ..	"
A. Hair ..	City and Umgeni ..	"	Umbabana ..	Zwaartkop Location
		"	Ungola ..	Edendale
		"	Unsiwa ..	Zwaartkop Location
		"	Umvell ..	"
		"	Umsu'u ..	"
		"	Lutye ..	"
		"	Ndudane ..	Bishopstowe
D. M. Pfaff ..	Utrecht ..	"	Thomas ..	Groot Vlei
		"	Vauns and Lamoen ..	"
		"	P. Priorius ..	Geluk
		"	Major and others ..	Spartiespruit
		"	Nkanda ..	"
		"	A. Wright ..	Rhenosterfontein
		"	C. Halferty ..	The Falls
J. Stewart ..	Bergville ..	"	J. W. Mann ..	Castle View
		"	J. W. Stewart ..	Bergville
		"	M. Radford ..	De Wet Stream
		"	J. Mortmer ..	Wy Kom
R. Wingfield Stratford ..	Newcastle ..	"	S. James ..	Fair View
		"	W. Steel ..	B. tha's Pass
		"	G. W. Thomas ..	Kingston
		"	D. Keay ..	Churnwood
C. E. Walker ..	Umsinga ..	Lungsickness	Nungawana ..	Umsinga
J. G. Speirs ..	Impendhle ..	Scab	Pind., Vete & Sobuon ..	Furth
H. C. Jarvis ..	Ixopo ..	"	L. Foster ..	Alicedale
H. C. Owen ..	Melmoth ..	"	Chas. Hunsley ..	Viakbuit

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Meleli	Polela, Location No. 2
Mboyea	Bergville.	Genegwa	" "
Nseleni	Markwa Mountain.	H. Wilkins	Vryheid, Little "
Pongwana	Upper Umkomanzi, Crown Lands		Hlobome

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions: Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlatatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Kshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned stock on the dates specified:—

On the 4th September:—

Charlestown.—(1) Bay gelding, hog mane, white spots on back, slit left ear, height about 14 hands, aged, no brands. (2) Bay gelding, white spot on tack, both hind fetlocks white, branded B.U right hip, about 14½, aged.

Glenton (Klip River Division).—Two black cows, one branded S on off hind leg, right ear end cut straight off, and half moon; the other with right ear cut straight off at end, and half moon.

Halting Spruit.—Young white Yorkshire sow, no ear marks.

Howick.—(1) Red cow, aged, notched in both ears, and tips off, no brands. (2) Two two-year-old oxen, one black, one black with white on flank.

Impendhle.—Chestnut yearling foal, white hind feet, in poor condition. Reported by the Stationmaster, Elands Kopp, C.N.R., as too wild to be driven to the Pound.

Krantzkop.—(1) White ram, no brands. Probable value, 10s. Impounded on the 30th July, 1907, by Ubey, a native of Hlangabeza Location. Supposed to be the property of some native. (2) Running on Mr. L. M. J. Van Rooyen's farm, "Sweet Home," and too wild to be driven to the Pound: Bay stallion, no brands. Probable value, £10. Reported on the 31st July, 1907, by Mr. L. M. J. Van Rooyen, "Sweet Home," Krantzkop. Supposed to be the property of some native.

Melmoth.—She-goat, about nine months old, black with white spots. Value 5s.

Meran (Waschbank Division).—Eight well-bred Angora goats, 6 ewes, 2 lambs, no brands, various ear marks on both ears, very long hair. Impounded by William Hattings, of "Gelegenfontein," Wessels Nek.

Mountain View (Newcastle Division).—(1) Brown mare, near front foot white, branded like O near thigh. (2) Brown filly foal, near hind foot white, no visible brand.

Redmain (Ingogo).—Horse, dark chestnut, branded 36, a bad sore back, very old, aged about 20 years. Impounded on the 14th July.

Serpentine (Newcastle Division).—(1) Kafir goat, ram, no marks or brands. Probable value, 5s. Impounded on the 3rd July, 1907, by K. Adendorff. (2) Two Kafir goats, kind of merinos: (1) ewe, right ear swallow tail and hole through it, left ear slit in back, square out of front; (2) slit in right ear, and swallow tail in left.

Utrecht.—(1) Dun cow, white on belly, branded L D near hip, slit out near ear. Probable value, £3. (2) Black and white heifer calf, no marks or brands. Probable value, about 15s. (3) Black cow, two years old, white on belly, slit out near ear, no brands. Probable value, about £3. (4) Red bull calf, about 18 months old, slit out near ear, no brands. Probable value, about £1.

On the 18th September :—

Finchley (Ixopo Division).—Bay gelding, flea bitten, lately clipped, mane has been hogged some time ago, black points and muzzle, had bags sewn together on as a blanket, and also halter.

Hope Farm (Newcastle Division).—(1) Donkey, mare, white, with mouse coloured foal, no brands or ear marks visible. (2) Donkey, mare, mouse coloured, no brands or ear marks. (3) Donkey, gelding, mouse coloured, no brands or ear marks.

Howick.—Running on the farm "Woodland," and reported by Mr. H. Stedman as too wild to be driven to the Pound: Bay mare, long tail and mane, two white feet, slight blaze down face, no brands visible.

Impendhle.—Two merino ewes, branded Y.T. on near side.

Loleni (Impendhle Division).—Brown gelding, long mane and tail, aged, slit in near ear, no brand visible.

New Hanover.—Running on the farm "Ambleside," New Hanover, and reported by Mr. C. C. Comins as being too wild to be driven to the Pound: Black and white heifer, 2 years old, slit in each ear, indistinct brand on right leg.

Serpentine (Newcastle Division).—(1) Kafir goat, ewe, right ear hole in centre, and swallow tail, left ear slit in back, square out of front. (2) Kafir goat, ewe, slit in right ear, left ear swallow tail.

Utrecht.—Chestnut mare, age about 2 years, star on forehead, long mane and tail, no marks or brands. Probable value, about £6.

Vergelegen (Vryheid Division).—(1) Dark brown mule, mare, freckled blaze, and three white hoofs, branded left side of neck indistinct B 173, left hind quarter indistinct Q-T, right hind quarter f over inverted Y, indistinct harness marks, in fair condition, long tail and mane, above 8 years old. Impounded with halter on. (2) Cream coloured mule, mare, light mane and tail, long, indistinct star, branded on right hind quarter, f over inverted Y indistinct, heart on right hip, on left side of neck 166 indistinct, on right shoulder O, indistinct, harness marks, above 8 years old, in fair condition. Impounded 22nd July, 1907.

It is notified that the Pound established at "Good Luck," Dronk Vlei, has been abolished, Mr. J. Anderson Speak having resigned his appointment as Keeper thereof.

A Pound has been established at Creighton, Ixopo Division, of which Mr. W. R. Banger has been appointed Keeper.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of July, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest Rain-fall in 1 day.		Total for Year from July 1st, 1907.	Total for same per'd from July 1st, 1906.
	Maximum	Minimum					Fail.	Day.		
Observatory ..	74.0	52.2	83.1	46.1	.16	5	.06	30th	.16	.23
Stanger ..	74.3	51.9	86	47	1.07	7	.46	2. th	1.07	.25
Verulam ..	74.7	48.7	85	43	.25	3	.10	19. & 26	.25	.06
Greytown ..	70.3	34.7	77	24	.19	2	.13	19th	.19	.05
Newcastle ..	69.6	32.5	74	24	Nil	—	—	—	—	—
Ndwedwe ..	64.9	53.6	78	47	.45	3	.30	20th	.45	.15
Estcourt ..	68.9	32.2	76	24	.00	1	.01	20th	.00	—
Mid-Illovo ..	72.0	47.5	88	38	.47	4	.37	19th	.47	.22
Port-shepstone..	73.7	59.0	81	45	.89	3	.47	20th	.89	.43
Umzinto ..	69.9	46.5	73	44	.20	1	.20	20th	.20	.29
Richmond ..	71.6	39.7	81	31	.40	2	.23	12th	.40	.49
Maritzburg ..	73.0	37.3	83	23	Nil	—	—	—	—	.01
Howick ..	63.5	31.6	78	22	.34	2	.19	19th	.34	—
Dundee ..	65.0	40.8	72	34	Nil	—	—	—	—	—
Weenen Gaol ..	74.3	23.8	84	21	Nil	—	—	—	—	—
Impendhle ..	69.9	31.4	74	16	.21	1	.21	19th	.21	—
New Hanover ..	70.4	35.1	80	25	.29	3	.22	11th	.28	.03
Nongoma ..	70.3	43.2	78	34	Nil	—	—	—	—	.04
Nqutu ..	65.4	42.5	71	35	.00	—	.0	27th	.00	.00
Undakazi ..	73.4	39.1	82	34	1.82	5	.82	19th	1.82	—
Melmoth ..	71.2	47.7	83	40	.06	3	.04	20th	.06	.35
Ubombo ..	75.1	57.4	85	45	.14	2	.12	19th	.14	.18
Point ..	—	—	—	—	.32	6	.22	18th	.32	.44
Camperdown ..	75.9	44.1	86	35	.12	2	.07	19th	.12	.22
Charlestown ..	62.6	26.4	70	17	Nil	—	—	—	—	—
Mahlabatini ..	75.9	45.2	84	40	Nil	—	—	—	—	.23
Empangeni ..	75.3	47.4	89	38	.65	6	.38	4th	.65	—
Buwer ..	—	—	—	—	.22	4	.12	19th	.22	—
Imbizana ..	—	—	—	—	1.05	4	.50	20th	1.03	—

Meteorological Observations taken at Private Stations for Month of July, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees)		RAINFALL (inches).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain-fall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.
					Fail.	Day.		
Nottingham Road ..	—	—	0.33	1	0.33	19th	0.33	—
Adamshurst (Wm. Adams) ..	84	34	0.07	1	0.07	19th	0.07	0.25
Hilton ..	78	31	0.23	2	0.20	19th	0.23	Nil
Mount Edgecombe (Natal Estates)	86	45	0.35	4	0.15	20th	0.35	.12
Corubia ..	—	—	0.26	—	—	—	0.26	.17
Milkwood Kraal ..	—	—	0.35	—	—	—	0.35	.00
Blackburn ..	—	—	0.49	—	—	—	0.49	.09
Saccharine ..	—	—	0.31	—	—	—	0.31	.07
Equeefa (W. Hawksworth) ..	85	48	0.15	3	0.06	20th	0.15	.28
Cedara—Hill ..	72	19	0.13	1	0.13	19th	0.13	Nil
„ Vlei ..	78	19	0.15	1	0.15	19th	0.15	—
Winkel Spruit ..	77	44	1.64	5	1.52	30th	1.64	.14
Bransholme ..	—	—	0.71	2	0.52	19th	0.71	.06

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. E. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are : —

Cattle per head	...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	...	1½d. each.
Pigs...	...	...	3d. "
Chilling and Freezing Beef,	1st week	...	1s. 3d. per qr.
"	2nd "	...	1s. "
"	Remaining weeks	...	9d. "
Sheep	per week	...	3d.
Pigs	...	...	6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	...	4s. each (including abattoir fee).
Sheep	...	...	6d. "
Pigs	...	...	1s. " up to 200 lbs.
"	...	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	...	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agr culture.

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

With reference to the visits of Agricultural Associations, in view of the fact that the cost of railway tickets is in future to be borne by the Department of Agriculture, and that the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

W. A. DEANE,
Minister of Agriculture

27th April, 1907.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer: W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smalhe, C. W. W. ysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee, W. R. Quesled, A. Gice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Boehmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schaefermann. Hon. Sec. and Treasurer: Frank J. Voek.

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THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustani, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 100. Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

101a.—A destitute boy of 17 years of age, and at present living on charity. Said to be strong and healthy and one who should be able to make himself useful on a farm.

No. 102.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

103a.—30 years of age, desires employment on tea estate. Has 3 years' experience in Ceylon and understands thoroughly, he states, the cultivation and manufacture of tea. Also kept the estate books.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a. About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

- No. 1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. (*Out of print*).
- 2.—"Manures on the Natal Market, 1902," by A. Pardy. [1902].
- 3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. (*Out of Print*).
- 4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
- 5.—"Weed Circular," by Claude Fuller. [1905].
- 6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
- 7.—"Tree-planting in Natal," by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. (*Out of Print*)
- 9.—"Potato Culture" by A. N. Pearson. [1905].
- 10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
- 11.—"Agricultural Statistics, Natal, 1904-5," [1906].
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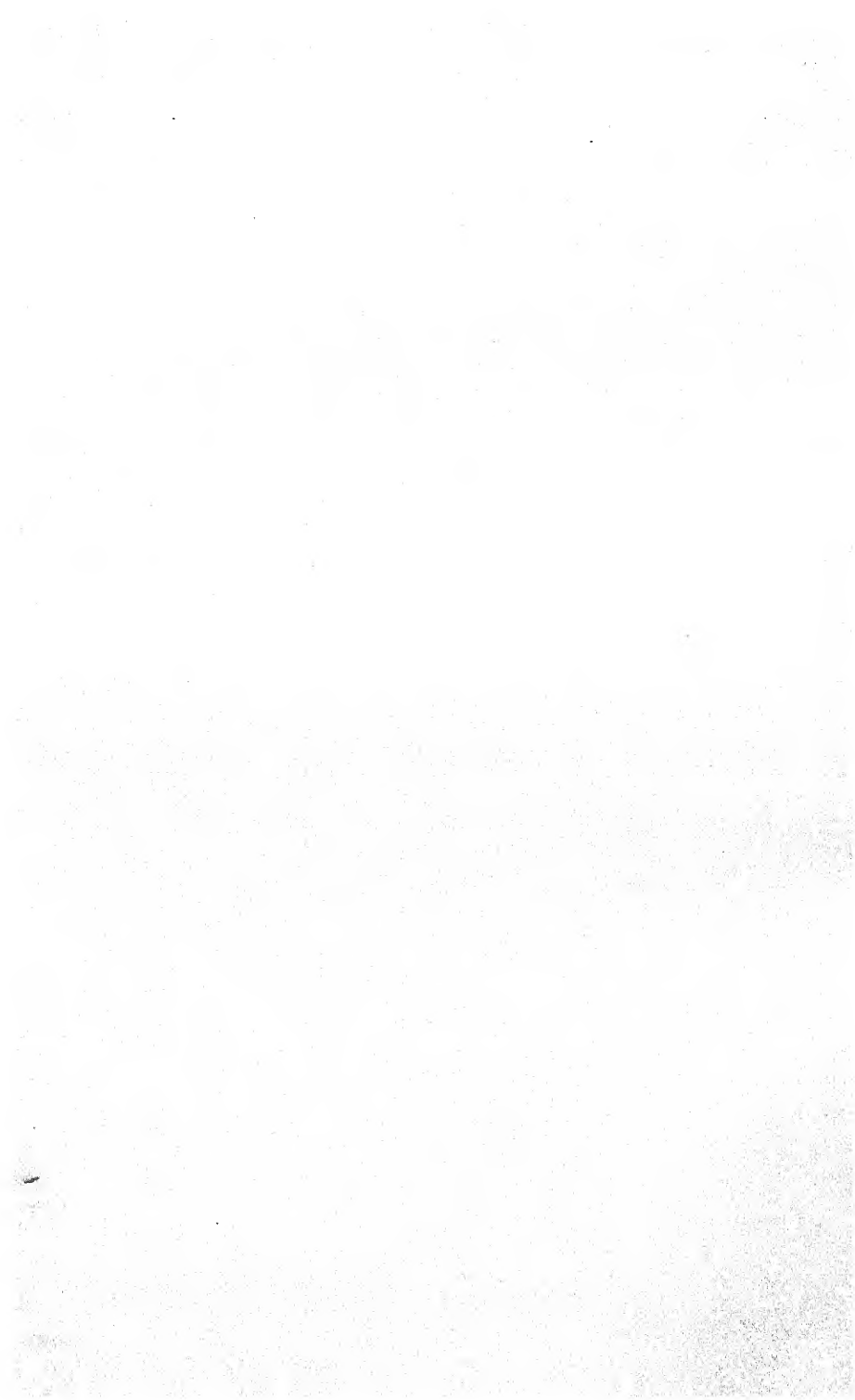
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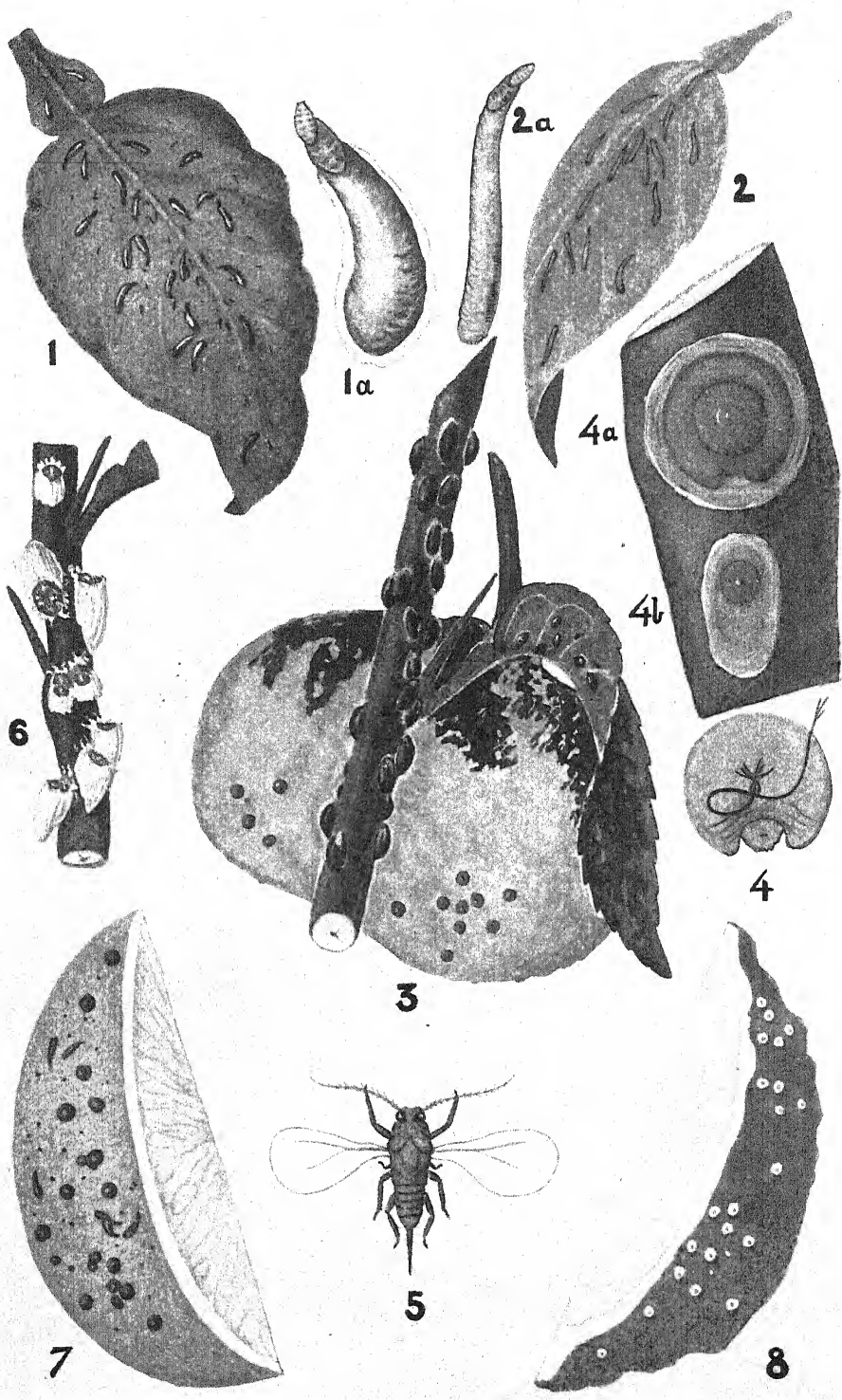
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SOME CITRUS SCALE INSECTS OF NATAL.

EXPLANATION OF COLOURED PLATE.

THE COMMON MUSSEL SCALE.

- Figure 1. Infested Orange-leaf *natural size*.
,, 1a. Scale of the Female, *enlarged*.

GLOVER'S MUSSEL SCALE.

- Figure 2. Infested Orange-leaf, *natural size*.
,, 2a. Scale of the Female, *enlarged*.

THE COMMON SOFT SCALE.

- Figure 3. Orange twig and leaf infested with Soft Scale ; young insects on leaf, adults on twigs, *natural size*. The blackened surface of both leaf and fruit is due to a fungus growing upon honey-dew secreted by the Soft Scale.

THE COMMON RED SCALE.

- Figure 3. Scales of the Female are shown on lower portion of Mandarin Orange, *natural size*.
,, 4a. Scale of the Female, on portion of thorn, *enlarged*.
,, 4b. Scale of the Male, *enlarged*.
,, 4. Adult Female as seen when extracted from 4a, *enlarged*.
,, 5. Adult Male Insect which emerges from 4b, *enlarged*.

THE AUSTRALIAN BUG ("Dorthezia").

- Figure 6. Infested Orange Twig, *natural size*.

THE CIRCULAR PURPLE SCALE.

- Figure 7. Portion of Orange infested with Circular Purple Scale in company with Common Mussel Scale, *natural size*.

THE CIRCULAR WHITE SCALE.

- Figure 8. Portion of infested Rough Lemon, *natural size*.

Natal Agricultural Journal and Mining Record.

Measles in the Pig.

By F. A. VERNEY, F.R.C.V.S.

NOTWITHSTANDING that measles in the pig is extremely common in Natal, the disease for the most part is not understood by the pig-breeders or pork-eaters of the Colony, although this disease is a great menace to public health, and a constant source of pecuniary loss.

Measles is due to the presence of the *Cysticercus cellulosae*, or the cystic stage of the *Taenia solium*, or armed tape worm of man.

Measles in the pig was recognised by the ancients, and there can be no doubt that it was owing to their observations of its injurious effect to health that the Egyptian priests, in the days of the Pharaohs and of Moses, prohibited the use of the flesh of the pig as a food. In the fourth century B.C. Aristophanes mentions the disease as being well known. Aristotle, Rufus, and Oribasius describe the disease with remarkable precision. In the Middle Ages, although legislation was brought to bear on pig measles, there was little idea of its parasitic nature as understood by the Ancients; and not until Malpighi, in the 17th century, who recognised its true significance, was the nature of the disease described, and it was not until the nineteenth century that the entire life cycle was satisfactorily proved, by Van Beneden and Kuchenmeister.

For the most part, it is only at the *post-mortem* examination that measles is discovered, and this is mainly due to the fact that the measles or cysts confine themselves in their distribution almost entirely to the muscular tissue or the flesh. The cysts appear as greyish egg-shaped bodies, varying in size from Kafir corn up to a garden pea. Careful examination will reveal, in the middle of its length, a white spot. This,

on magnification, shows an opening, which corresponds to the invaginated head of the tape worm, and by methodical pressure the head and body of the *cysticercus* can be extruded. If the head is examined microscopically by a low power, it will be found to have four suckers and a double crown of from 24 to 32 hooks.

Measles may be found in any part of the muscular tissue, but it has certain predilection seats, which should always be looked at in cases of suspected measles. The tongue, muscles of the neck, shoulders, and muscles between the ribs, are the most common seats of measles, but in a bad case the cysts may be found permeating the whole of the muscular tissue of the body, including the heart. In rare cases they may be found in the organs of the body, and even in the brain. The muscles infested with measles are pale and soft, and when the cysts are in great numbers on section a yellowish fluid exists on the cut surface, due to the division of some of the cysts by the knife. Except for these changes, the infested animal is usually healthy and may be exceedingly fat, and this in bad cases strikes one as being very remarkable.

It is unfortunate that measles in the pig cannot be readily diagnosed during life, as it is frequently a cause of great dissatisfaction between buyers and sellers. Experience shows that one of the favourite places for the cyst to reside is the tongue, and this is made use of as a means of diagnosis during life. The tongue should be examined underneath and at each side for cysts; and if they exist one can certainly declare the animal measles; but, on the other hand, it does not follow, if there are no observable cysts on the tongue, that the animal is not affected with measles. Other places measles may be observed are around the eye (*Conjunctiva*) and in the folds of the rectum.

Measles may be found in all breeds of pigs and at any age, but experiments go to show that young pigs are more readily infected than old.

TREATMENT.

No curative treatment has been found to be effective. With our knowledge of the life cycle of the *Cysticercus* all treatment should be of a prophylactic nature. Van Beneden was the first to cause a pig to swallow the eggs of the human tape worm (*Taenia solium*); and, after killing this pig, he found a great number of *cysticerci* in the muscles. This experiment has been verified by numerous observers.

When the ripe egg of the *Taenia solium* reaches the stomach and bowels, the shell is dissolved by the digestive juices, and the embryo set free. The embryo has six hooks which enable it to burrow through the walls of the stomach or intestine into the blood stream, and it then becomes arrested in one of the muscles of the body. Here it grows the necessary parts to complete the condition known as measles. Experiments have shown that it takes about three months for the swallowed eggs to arrive at the completed form of the *Cystercus cellulosae*.

Each segment of the *Taenia solium* passed in the faeces of man is capable of furnishing innumerable quantities of eggs; and as these eggs are capable of living for a very long time in the ground, manure pits, pools of water, etc., it can be easily understood why pigs in this Colony are so commonly affected with measles. It is well known that the native population are commonly the host of tape worms, and this, associated with their insanitary habits, and the common method of pig-breeders to allow their pigs to roam about townships, kafir kraals, and the veld, are the main factors for the upkeep of the disease. Strict attention to sanitation is the secret of keeping pigs free from measles. All pigs should be confined, and all natives where pig-breeding is carried out should be made to use properly appointed latrines. It is quite a common sight in many of the townships of this Colony to see numbers of pigs grazing within and around these townships; and this, associated with the insanitary arrangements that are allowed to prevail, cannot but bring considerable monetary loss to owners who endeavour to breed pigs under such circumstances. It is advisable, considering what a very common disease measles is in Natal, for anyone to refuse to purchase a pig, either for breeding or consumption, unless it is accompanied with a guarantee that the pig has been properly confined since birth under proper sanitary conditions, or with a consent to refund payment should the pig show measles on slaughter. Those farmers who contemplate the formation of bacon factories should certainly enforce these conditions, otherwise their labours are bound to end in serious loss and considerable dissatisfaction to all parties.

Kuchenmeister was the first to demonstrate the fact that the measles cyst of the pig when eaten by man is transferred into the *Taenia solium* in the intestines. In one experiment he fed a woman three days preceding execution on 75 measles cysts, and after her death he found ten well-formed tape worms. On another occasion he fed a man, also condemned to death, with 10 measles cysts 4 months previous to death, and 10 more 2½ months previous to death. The *post-mortem* examination revealed 19 well-formed tape worms, 11 of which had well-formed segments.

These experiments have been conclusively verified by numerous observers, and they also coincide with clinical facts, for it is well known that Jews, Mussulmans and other races who do not eat the flesh of the pig are never infested with the *Taenia solium*.

It is perhaps gratifying to know that proper cooking destroys the head of the worm, but in large joints the centre of the meat probably never reaches a high temperature, and in many cases one often meets a joint underdone. After pork has been treated for sausage meat, it is impossible to recognise the disease, and in a country where pig measles is so common, and meat inspection not rigidly carried out, these articles cannot be above suspicion.

Notes and Comments.

WATTLE-GROWING IN AUSTRALIA.—Attention is now being given to the increased production of wattle bark in Australia. Efforts are being made to improve the quality of the bark produced, by selecting only mature trees for stripping, and to modernise the methods of manufacturing wattle bark extract. Attention is also being paid to the possibility of utilising the leaves of the wattles for the manufacture of tanning extract.

"JOURNAL" IN DUTCH.—The Dutch and other sections of our readers will be interested to hear that negotiations are being made for the publishing of a Dutch issue of the *Journal*. It is hoped—if the negotiations end satisfactorily—to commence the issue of the Dutch version in January, 1908. It will, of course, be a full translation of the English issue, and will probably appear a week later than the English version.

S.A. INDUSTRIAL EXHIBITION.—It is announced that a South African Industrial Exhibition is to be held in Capetown during the month of January next, under the direction of the South African Manufacturers' Association. The object of the Exhibition is stated to be "to educate the people of the country as to what can and is being produced and manufactured within our own borders." The Hon. W. A. Deane (Natal Minister of Agriculture) is according his patronage to the project. It is hoped that our Natal industries will be well represented. Those interested as desirous of exhibiting should place themselves in communication with the Secretary of the South African Manufacturers' Association, whose address is P.O. Box 936, Capetown.

CITRUS FRUITS FOR THE TRANSVAAL.—A communication has been received by the Minister of Agriculture from the Minister of Agriculture of the Transvaal regarding the condition in which Citrus fruits from Natal are consigned to that Colony. It is stated that much of the Citrus fruit from Natal arriving in the Transvaal is very badly infested with scale insects and Codlin moth, in spite of the warnings which have been issued to fruit-growers by the Natal Entomologist. The Transvaal Minister of Agriculture notifies that next season all consignments of fruit badly infested with scale insects and orange Codlin moth will be destroyed upon their receipt in the Transvaal. This warning will give Natal fruit-growers ample time to take measures for the proper cleansing of their trees.

CITRUS FRUITS.—Attention must be again directed to the state in which citrus fruits are being exported to the adjoining Colonies. Advice has just been received that a consignment of 28 cases of naartjes reached the Transvaal so badly infested with mussel and purple scales that the fruit had to be destroyed. The Minister of Agriculture trusts that, in their own interests, consignors will see that nothing but sound fruit is forwarded to local markets.

MEALIE-COB CHARCOAL.—Charcoal can be very simply made from mealie cobs. The following directions for making it, from the United States, may be of value to Natal mealie-growers:—Dig a hole in the ground 5 feet deep, 1 foot in diameter at the bottom and 5 feet at the top, for the charcoal pit. Take the corncobs, which have been saved in a dry place, and starting a fire in the bottom of the pit keep adding cobs so that the flame is gradually drawn to the top of the pit, which will be thus filled with the cobs. Then take a sheet-iron cover, similar to a pot lid in form, and over 5 feet in diameter, so as to amply cover the hole and close up the burning mass, sealing the edges of this lid in turn with earth. At the end of twelve hours you may uncover and take out a fine sample of corncob charcoal.

HENS AS MOTHERS FOR GOSLINGS.—A correspondent of the *American Agriculturist* gives a few useful hints under the heading "Hens as mothers for goslings." He states that the first thing in hatching goose eggs under hens is never to put more than three or four under a good hen, otherwise she will not be able to cover them all. It is suggested that the hen should be confined to a fair-sized run with her nest enclosed in some quiet place, and to keep a dish of pure water, also one of grain, where she can help herself. She should be dusted well three or four times with lice powder; and all clean eggs should be removed after the seventh day. When the goslings hatch the most careful hen should be given four to six. Confine the hen and goslings in a shady grass run and keep them well supplied with water, which should be given in a drinking fountain—one that the young ones cannot get into and that can be washed clean inside and out. The yard must be changed often enough to have good, soft grass all the time, which is the best goose food. If easily obtained, give bread and milk with a small amount of shorts and meal mixed with it for the first week; also add about a fifth of rolled oats to the feed. After the first week increase the amount of shorts and corn meal, also add a little beef scraps. After a month they can be fed mostly on shorts, corn meal and oats, with about a fifth of the feed compound of beef scraps. Plenty of grass, good but not too much feed, clean coops and pure water all the time, will make the goslings larger than the hen at one month old.

SISAL PLANTS.—In connection with statements made on page 746 in the July number of the *Agricultural Journal*, the Conservator of Forests has now heard from Messrs. Reasoner Bros., Oneco, Florida, U.S.A., that they are prepared to supply *Agave rigida* var. *Sisalana* in quantity, as fine one-year bulbils from nursery beds at 650 dollars (£135 8s. 2d.) net per 100,000 free on board at their station. The freight would have to be prepaid, and may work out at about 200 dollars for same quantity.

E.C.F. QUARANTINE AREAS.—Under a Government Notice dated the 8th August, the following farms have been constituted a quarantine area under the East Coast Fever Act, 1906, viz.:—Unnambiti, Borderkloof, Howe, Ingula, The Zone, Netherby, Nondela, Tintwa, Middledale, Wittekop, Shadyglen, Scerp Rand, Tent Hoek, Zuurkloof, Schoonspruit, Stryd Hoek, Overwent, Deelspruit, Klaarfontein, Tultinchinwall, Abergeldy, Mains, Droogkop, Bulwer, Venters Spruit, Badenhorsts Vallei, Klipplaatsfontein, and that portion of Nooigedacht lying to the East of Venters Spruit, Spion Kop. These farms are, for the purposes of the East Coast Fever Act, deemed a portion of the Magisterial Division of Klip River; and no cattle are allowed to enter from, or proceed to, the Magisterial Division of Bergville. The Magisterial Division of Mtunzini has been declared a separate infected area within the meaning of the East Coast Fever Act, 1906; and the ingress into, egress from, or movement within that area has been prohibited.

ENTRY OF SHEEP INTO CAPE COLONY.—The *Cape of Good Hope Government Gazette* of the 23rd August contains a Proclamation by His Excellency the Governor of that Colony imposing certain restrictions on the introduction of sheep from Natal into Cape Colony. The introduction of sheep from Natal into Pondoland is absolutely prohibited. The introduction of sheep into East Griqualand from this Colony is also unlawful, with the exception of sheep from Alfred County (which must be accompanied by a sworn declaration that they have not come from or been in contact with animals which have come from a locality beyond the limits of Alfred County), unless they are accompanied by a certificate, signed by "an Inspector of Stock appointed to administer Scab Laws or Regulations in Natal," to the effect that such sheep are free from scab and have been properly dipped in an approved arsenical dip at either of the Ports of Entry established on the border at Stanford's Drift or Union Bridge. Such sheep must also be inspected, before their introduction, by the Sheep Inspector of the district or area in Griqualand East into or through which they are intended to pass, who shall, if he is satisfied that the animals are free from scab and that they have been properly dipped as indicated, make an endorsement to that effect on the certificate.

AUSTRALIAN WOOL IN 1906-7.—In summarising the principal features of the Australian wool year, 1906-7, in their annual wool review, Messrs. Dalgety & Co., Ltd., state that the Australasian clip was the largest on record. The average value of all wool was high, and the average value for cross-bred wool was higher than that for merino. Attention is drawn to the increased strength of the German and American demand, and to the broad scope of the latter. The large proportion of the clip sold in the Colonial markets is also remarked upon.

"DAGGA" [INSANGU] IN CAPE COLONY.—By the provisions of a Bill which is now receiving the attention of the Cape Parliament, it is proposed to make it unlawful for anyone (with certain exceptions) to in any way supply to or receive from any person, or to grow, cultivate or prepare, the herbs *Cannabis sativa* ("Indian Hemp," *Dagga* or *Mak Dagga*), *Leonotis leonurus* (Wild or Red *Dagga*), and *Leonotis orata* (*Klip Dagga*). The exceptions referred to are registered medical practitioners, chemists and druggists, and the holders of licenses issued by Government for the cultivation and preparation of the herbs for medicinal purposes. The punishment imposed for contraventions of this Act will be a fine not exceeding £25 or imprisonment for three months.

PASTURE FOR SOW AND PIGS.—A correspondent of the *American Agriculturist* writes regarding the method of providing pasture for sow and pigs. He states that he has found it good practice to construct a number of half-acre lots, placing a portable house in every other one and giving a sow and her pigs an individual house. By the time they will have eaten or stamped down all the green stuff on this half acre, the house can easily be lifted over the fence to the next lot and the hogs moved where they will have plenty of fresh green pasture. The lot from which they have been taken can be ploughed up and sown in rye or forage crops that grow comparatively fast. By the time they have exhausted the second lot they can be returned to the original one. Thus the two lots will support the sow and pigs until the pigs are old enough to wean. If properly cared for they will support the sows the year round. He states that he has also found good practice to have a larger lot, if possible, of from five to ten acres, to run all the pigs into after they have been weaned, and allows them to remain there until they are four or five months old. He feeds them in the meantime and allows them plenty of ground and exercise so that they may develop bone and muscle. They are then in a good, healthy condition to go into the feed lot. In building these portable houses, there is one thing that must ever be borne in mind, and that is, no matter how or where they are built, they should provide good, clean, dry sleeping quarters, and, above everything, be sanitary.

PROTECTION OF BIRDS IN CAPE COLONY.—A Bill “to amend the law for the protection of wild birds” is being considered by the Cape Parliament, under which it is proposed to prosecute “any person who shall, in any public street, thoroughfare, market or place, sell or offer or expose for sale” any of the following birds:—Yellow-bellied Seedeater or “Klein Saysie” (*Serinus fluviventris*); Large yellow Seedeater or “Geel Saysie” (*Serinus sulphuratus*); Common Wax-bill or “Rooibekje” (*Estrilda astrilda*); Brown or “Pietje” Canary (*Serinus tottus*); Cape Canary (*Serinus canicollis*); Cape Robin or “Jan Fredric” (*Cossypha Caffra*); Bush Shrike or “Bakbakiri” (*Laniarius bakbakiri*); Bunting or “Streep Kopje” (*Fringillaria capensis*); and turtle doves of all sorts.

WASTE BANANAS AS STOCK FEED.—For many years stock-owners in Jamaica have utilised their waste bananas for stock-feeding purposes; and lately Mr. C. W. Meaden, of the Government Farm, Trinidad, has recommended, as the best way of utilising waste bananas, that they should be ground up and fed to live stock. Mr. Meaden has followed this course himself, obtaining, as he says, satisfactory results. The bananas are broken up in what is known as a “root pulper,” and some cocoa-nut or cotton seed meal, together with a little molasses, is added to the crushed fruit, which addition—apart from its own feeding value—corrects the astringent properties of the green bananas. Mr. Meaden says that the mixture is used to the best advantage when fed to milking cows, growing stock, and working oxen, and all these animals consume it with relish. It is not so suitable for mules, or other stock; and if given to pigs or poultry should first be cooked.

MEALIE EXPORT.—Mr. J. A. Westbrook, of the Dalton Farmers’ Association, has been appointed by the Government as Inspector of Mealies at the Point. Not only are many farmers taking advantage of the Government grading, but the majority of the merchants also recognise the advantages to be derived therefrom and are having all the mealies passing through their hands for export graded and weighed before shipment. This enables the mealies to be sold on sample before arrival. *Reuter’s* agent cabled on the 20th September that mealies were realising 25s. 7½d. a quarter of 480 lbs. on the London market, a price equivalent to 10s. 8d. gross per muid of 200 lbs. If the Natal mealies realise the same figure, the net amount will be from 8s. 2d. to 8s. 9d. a muid according to the distance from the port. Merchants have this season—up to the date of these notes being written—sent away some 50,000 bags, and there are some 20,000 more at the Point ready for shipment. Farmers have sent away some 2,000 odd bags through the Government, and other consignments are coming forward by rail, so that it will be seen that a sufficient quantity is being shipped to prove the success or otherwise of the exportation.

U.S. IRRIGATION ENTERPRISE.—A project is on foot, under the direction of the United States Coast and Geological Survey, to irrigate several thousand acres of unproductive soil in the southern part of Utah County, Utah. A storage dam having a capacity of nearly 5,000,000,000 cubic feet of water will be thrown across the Strawberry River, and the water will be led through a tunnel more than three and a half miles long to the distributing points, where it will be diverted into canals for irrigating the various ranches. This stored water power will also be used to develop electrical current, which will be used to light neighbouring towns and to drive the centrifugal irrigation pumps. Work on the tunnel is already under way.

CITRATE OF LIME IN SICILY.—In a report on the citrate of lime industry in Sicily, Mr. Sydney Churchill, H.M. Consul for Sicily, states that in Sicily the lemons are produced by grafting the lemon on the bitter orange tree. The lemon is too subject to disease to be good for the production of the lemon used commercially. Concentrated lemon juice is produced by boiling the raw product. This is only done when the juice is exported, and is in order to preserve it from fermentation. The fresh fruit, only the refuse unfit for export as table fruit, is peeled in three pieces. The peel is used in the production of essences and oil, of lemon or cedrat oil. The pulp is then placed in baskets made for the purpose, and put under an ordinary wood press with an iron screw, by means of which the juice is extracted. The baskets are then emptied out, and the refuse is used as food for goats—some cows even eat it—or it is employed as a fertilizer. The juice is then taken to the factory, and passing through some processes is manufactured into what is known as citrate of lime.

WEEDS.—When the weeds are dug under, they act as a mild form of green manure; and if the seed pods are not ripe, the weeds (which in many cases are a perfect pest) will be destroyed entirely. However, on the other hand, there are certain weeds which, when dug under, instead of being killed are stimulated into stronger and more extensive growth. Such weeds are those which reproduce themselves by means of underground rhizomes—for instance, sorrel and nut grasses, which are simply a mass of underground rhizomes; others are propagated by means of bulbs, such as *Oxalis*, several species of which are found in Natal. In addition, there are those that have tubers, etc. Therefore, these should on no account whatever be dug under. The only means of ridding the garden of them is to dig the ground and carefully go over the soil and remove every trace of their underground roots or bulbs. This work being of a rather tedious nature, requires a certain amount of patience, but nevertheless it is the only effective means of improving the soil for gardening purposes.

A NEW BANANA PRODUCT.—According to the *Agricultural News* (Barbados) another product of the banana is announced as having been put on the market, consisting of the pulp of the banana, ground to flour and mixed with triturated cacao (*Theobroma*) seeds, milk powder, and extract of malt. The description of the process of manufacture states that the peel of the mature banana fruit is removed, the fruit is pulped, dried and ground to powder. The essential oil, which has been extracted from the peel, is now added to this banana flour, as well as a proportion of dried milk powder and pure extract of malt, together with the paste prepared from the cacao seeds, and finally a sufficient quantity of sugar for flavouring. It is claimed for this composition that it possesses all the essential elements of a complete food in a concentrated form, namely, albuminoids, carbohydrates, and fatty substances.

DESTRUCTION OF BURR WEEDS.—The attention of owners and occupiers of land in all parts of the Colony is drawn to the desirability of destroying, during the months of November and December at the latest, the various forms of burrweed and thistle (*Xanthium spinosum*, *X. strumarium* and *Oniscus diacantha*) that at present exist to such an extent in this country. The present time of the year—up till about the end of December—is the most suitable period for such destruction, as the seeding stage is thus avoided and the spread of the plants by the scattering of the seeds is thereby obviated. It is reported that these weeds are spreading to a very serious extent in some parts of the Colony owing to the neglect of owners and occupiers of land in destroying them. All who have these weeds growing upon their lands are earnestly urged to use their utmost endeavours to assist towards the complete eradication of the pest in the Colony by destroying all patches that may exist on their land.

SUGAR IN BREAD.—Mr. Francois Dupont, in a paper read before the Bordeaux Congress of the Association of Sugar Chemists in France, suggests the introduction of sugar into bread in quantities varying from $4\frac{1}{2}$ to 15 per cent. or more, in order to attain to a large increase in the consumption of sugar. He claims that bread containing, say, 5, 10, or even 15 per cent. of sugar is lighter and more agreeable to the taste, and has a higher alimentary value and greater digestibility. The quantity of bread consumed in France is stated to be about 8,000,000,000 kilos per annum. The introduction of 5 per cent. of sugar would result in an increase in the consumption of the latter commodity amounting to 400,000,000 kilos per annum. The introduction of ten per cent. of sugar would bring about an increase in consumption annually amounting to 800,000,000 kilos—that is, more than the average actual production of France. As a consequence, growers of sugar beets would be able immediately to almost double their production of beets.

THE "INDIAN RUNNER" DUCK.—There are several breeds of ducks which are fairly good layers, and will lay anything between eighty and one hundred and twenty eggs in a year, but these are the table breeds. The only duck which, in the opinion of the *Journal* of the Department of Agriculture of Ireland, is worth considering as a profitable egg-producer, is the Indian Runner. It is, it is stated, one of the most profitable breeds that can be found when one has an unlimited range for it or even a large field, because it is a first-rate forager and is ever on the move in search of food, so that, if a supply of natural food is available, this duck requires, or will take very little, from the hands of its owner. On the other hand, it is also a very useful duck to keep where space is limited and water is scarce, for in these conditions it thrives equally well, though, of course, it consumes more food and lays fewer eggs. It is, indeed, one of the few breeds that will do well without having access to a brook or pond, and for this reason it is kept by many who have no facilities for keeping ducks of other kinds.

MEMORIAL TO THE LATE DR. HUTCHEON.—A large and influential committee has been formed in Capetown for the purpose of providing a memorial to the late Duncan Hutcheon, for so many years Chief Veterinary Surgeon of Cape Colony and latterly Director of Agriculture there. It is, of course, anticipated that the greater portion of the funds forthcoming will be subscribed in Cape Colony, but the late Dr. Hutcheon was so well known throughout the sub-continent and so much of his work was of direct benefit to South Africa as a whole that the Committee feels that there must be many residents in other Colonies who would be pleased to subscribe to so laudable an object as that for which funds are being invited. It may be mentioned that the widow and two daughters have been left in straitened circumstances, and it is generally felt that the memorial could not take any more suitable form than the provision of an annuity to supplement the small pension to which the widow is entitled from the Civil Service fund. Should sufficient funds be subscribed over and above the amount required for that purpose, the balance will be devoted to the provision of such other suitable public memorial as may be decided upon. Mr. Claude Fuller, Government Entomologist, has been selected as the Natal member of the committee; and those desirous of expressing, in a substantial form, their appreciation of the valuable services which the late Dr. Hutcheon rendered to South Africa, are invited to communicate with Mr. Fuller. Mr. Fuller has sent a circular letter on the subject to the various agricultural associations of the Colony, and readers of the *Journal* who are members of any such associations are recommended to transmit their subscriptions through the secretaries of their respective associations. It is hoped that there will be a ready response to the appeal that is being made.

POTATO-GROWING EXTRAORDINARY.—Will potato-growing pay on the Coast? Mr. A. H. Konigkramer's recent feat would seem to settle the question, decidedly in the affirmative. From about two acres Mr. Konigkramer obtained 161 bags; and these, sold wholesale to Messrs. Grice and Cook, of Durban, at 10s. a bag, yielded an average of £40 an acre. "Georgicus," the contributor of the notes on "Coast Agriculture" to the *Mosquito*, has investigated and obtained details. Mr. Konigkramer (who has recently taken up a farm on the Ingagane) planted six bags of Sutton's Early Rose, second planting from imported seed, in November. The land, which was virgin soil, and was in extent about two acres, was, six months previously, ploughed, cross-ploughed, and harrowed. It was drilled at time of planting, the drills about eighteen inches apart. The potatoes were put in uncut at a distance of about two feet six inches. They were then covered with a good dressing of old kraal manure, and the drills then split with the plough. When the plants were about a foot high they were earthed up by hand. The individual potatoes dug weighed, on an average, 1 lb. apiece.

REARING CHICKS.—Discussing the question of incubators or hens for the early chicks and early spring hatching, a correspondent of an American contemporary remarks that the incubator can be relied on, for at that season very few hens become broody. It is also a pleasure to operate the incubator at that time, as one cannot keep a regular temperature as the season grows warmer, unless the incubators are run in cellars made for the purpose, which the majority of poultry raisers have not got. The hen is therefore preferable from the middle to the latter part of the hatching season. It would be advisable to erect a house about 15 feet square, to be used entirely for the purpose of sitting hens. When a hen becomes broody, fix a nest for her, put in the eggs, then at night carry biddy to her new nest. The hen will rarely leave her nest after sitting at night. As many as 30 hens may be lined up around the room, and they should not be allowed to leave until they have gone through the hatching. Keep at all times plenty of good feed, wheat, corn and oats mixed; fresh water every day, and a good supply of grit and charcoal and also the dust box, which should be used at least once a week with a good vermin destroyer. Certainly, the hens may change nests at times, but that is a matter of indifference, if each hen does her duty as far as the hatching is concerned, which after all is only what is required of them. Do not take the chicks from the incubator or nest till they are at least 24 hours old, then remove to brooder heated at from 90 to 95, degrees. After the chicks are removed give them a pan of fine sand with fresh water, but be careful not to bother them, for six or eight hours other than to look after the heat. The first feed should be, hard boiled eggs with a few bread crumbs, either wheat bread or corn bread. The food should be varied with boiled eggs, bread crumbs and one of the commercial chick feeds for the first week. Oc-

casionally feed with boiled rice, boiled potatoes, chopped onions, lettuce and lawn clippings for green foods. Till the chicks are six weeks old, continue the same diet, with the exception of boiled eggs and less rice. Fresh corn bread should be made every morning, which should have mixed with it plenty of good milk.

SWINE BREEDING.—Discussing the question as to the age at which swine should breed—a question of great significance, because of its bearing on the future of the swine industry—Prof. Thomas Shaw, writing in the *American Agriculturist*, points out that the tendency during recent years has been to breed only from immature animals of both sexes, and the industry has suffered accordingly. He considers that males well managed and cared for should be of most value from one year onward, as long as they are active and retain unimpaired begetting power. The limit of best usefulness is, all things considered, usually over when they have passed the fourth or fifth milestone, but there are instances in which sires should be kept to a greater age, as, for instance, when they have shown a marked and excellent prepotency. Sows usually furnish and rear the best litters from, say, eighteen months to the age of four or five years, but in some cases they should be kept to a greater age. They are too old for the best service in breeding when the litters produce pigs uneven in size and when the dams become so clumsy that they overlay and thus destroy some of the young. No age limit, Prof. Shaw concludes, can be fixed in a hard and fast way, as some sows can be kept with profit two or three years longer than others.

MINES DEPARTMENT REPORT, 1906.—The annual Report on the Mining Industry of Natal, for the year 1906, prepared by Mr. C. J. Gray, Commissioner of Mines, has now been issued. The report contains a large amount of interesting information relative to the present position and prospects of the mining industry of the Colony, and is divided into three parts: part i., on the mining industry proper, deals, among other matters, with the mineral output of the Colony, export and consumption of coal, financial position of the coal mining industry, mineral holdings and mineral development; part ii. consists of a resume of the work accomplished by the Mines Department; and part iii. comprises a number of appendices—districts reports, special reports (a report on the iron ore deposit at “Prestwick,” near Dundee, and on limestone deposits near Waschbank, a statement of the results of Government prospecting near Fawsley Park, near Stanger, some geological notes on the Dania Copper Mine, Nondweni, and its vicinity, and a report on the Rebellion Reef, Mpapala), etc. The report, the price of which is 2s. 6d., may be obtained from the Office of the Commissioner of Mines and the Stationery Storekeeper, Colonial Secretary’s Department, Maritzburg, and also from the District Mines Offices at Nkandhla, Vryheid and Dundee, from the Natal Government Agent at Johannesburg, and from the Clerk in Charge, Railway Excise, Durban.

LAMENESS IN HORSES.—Mr. W. H. Shoobridge gives some interesting hints in the *Agricultural Gazette* of Tasmania on how to discover lameness in horses. To find out whether a horse is lame, have him trotted along the road straight toward or straight from you. Notice how he places his feet on the ground, and also how he carries his head. If he is lame, say in the near-foreleg, he will bob his head slightly when he puts his off-leg to the ground, because in easing the near-leg he puts more weight on the lame side. Then feel down the legs, examine the shoulder for shoulder-slip, then the elbow for capped elbow, caused by shoe as he lays down; then the knee, to see if it has been broken or if either the upper or lower knee-joint is stiff. Then look out for splints, either simple or peg; these occur mainly on the inside of the cannon-bone, and may catch the other foot. Then examine for brushing on ring-bone, either upper or lower. This may be detected by the horse walking on heel and toe, and can be eased by rocker-shoe. If the horse stands with his foot out, it may be navicular disease: that is, in the navicular bone, behind the pedal bone. Then tap hoof to examine for laminitis or inflammation of the laminae. Or it may be corns, red dots under the shoe, which may be eased by cutting end off the shoe. It may be caused by contracted feet, or even some bruise or injury to the foot, either by rough road or bad shoeing. It may be a tendon strained somewhere (wind-galls are a sign of over-strain, but seldom cause lameness); examine carefully, and notice if the horse flinches. If it is suspected in the hind leg, examine first the hip joint, then the stifle, for any irregularity, then the hock for capped hock, or even for curb just below the hock; or it may be spavin. It may be that he brushes or kicks himself, or it is possible that it is in his feet, though as a rule you may say, if you cannot tell what it is, in the forelegs, that the trouble is in the feet; and if you cannot find out the trouble in the hind legs, it is probably occult spavin. The horse will stand with his foreleg out to rest a shoulder trouble or navicular disease; and will almost always rest any other leg when standing if there is anything the matter. Greasy heels sometimes cause lameness, but are easily detected.

A *Reuter* message from Capetown states that a movement is on foot to form an organisation the chief aim of which will be the prosecution of an educational campaign throughout Cape Colony in favour of Colonial industries. The co-operation of a large number of members of Parliament has, it is stated, been secured.

Milking Machines.

IN Victoria, New South Wales, and New Zealand, where dairying forms one of the leading industries, the value of milking machines to the dairy farmer has been demonstrated; and that they have proved successful is indicated by the number of machines that have been installed, and also by the fact that the makers have the greatest difficulty to cope with orders. Milking machines of different types have been on trial for many years past, but it was only about two years ago that the Gillies improved cup brought the machine to do good work, and remedied the one weak point in its construction. The *Journal of Agriculture*, Western Australia, recently described this machine, which is now known as the Lawrence-Kennedy-Gillies. Each machine consists of two sets of four cups, from which the milk runs into a can in the centre of the bails. For the purpose of working these machines, double bails are required so that two cows can be milked at once. On top of each can is a pulsator worked by the vacuum from the vacuum tank, which is in turn pumped free from air by means of a small air pump. The can is placed in the centre of the bails and the cups adjusted on the teats of the cows, the tap turned on, and the milk flows from the tubing into the milk bucket. The action inside the cups is such that the milk is not drawn from the cows by means of a vacuum, but the inside of the cup, which is composed of rubber, is made to pulsate, and presses the teat in a similar manner to that of the hand when the milking is performed by hand labour. As soon as the machine has been placed on two cows, the man in charge proceeds to the next bail, in which he bails up two more cows, washes their udders, etc., and as soon as the cows on which the machine is at work have ceased milking, he shuts off the pulsators and shifts the machine to the next bail and puts it on to the cows there; he then returns to the first bails, releases the cows, and bails up two more, and so on. According to the time of the year, or the amount of milk the cows are giving, one man with the aid of the machine can put through 14 to 18 cows per hour. Consequently, an installation of three pulsators is capable of dealing with about 50 cows per hour with a minimum of labour.

An installation consists of any number of pulsators, according to the number of cows proposed to be dealt with, a three-can installation being sufficient for 100 cows; a vacuum tank, air pump, and the necessary piping, stop cocks, vacuum indicator, etc. In addition to this there is the necessary motive power to be found to drive the air pump. A two-horse power oil engine is sufficient for a small installation, but any form of power already on the farm can be used for this purpose, or a small boiler can be

used instead of an air pump, as an ejector can be fitted which will be considerably cheaper in the first instance, but where fuel and water are any consideration a small engine would prove most satisfactory. A similar plant to that working at the Perth Exhibition can be purchased for about £100 without the motive power, and that anyone with a herd of about 100 cows would be able to pay for the plant in less than twelve months owing to the saving in his bill for labour. One of the great advantages of the milking machine is that it makes the dairy farmer to a great extent independent of the labour question. Labour for milking cows is often difficult to obtain, and when obtained is often unsatisfactory, as those engaged in the industry know to their cost. The cows have to be milked at regular and stated intervals, and if for any reason this is not done very bad results follow. In the event of his men leaving or going on strike, the dairy farmer in a large way is to a great extent at the mercy of his employees, and often to save his cows has to concede terms that he would not otherwise do. With an installation of milking machines dairymen are to a great extent independent of labour, as in the first place he can do with about half the hands he requires for hand-milking, and in the event of any trouble occurring can, with very little more labour, manage to milk the cows himself by working the machines a little longer, and this might be impossible if he had to milk them by hand. The stalls required for operating the milking-machine should be 7 feet wide, and constructed to accommodate two cows, so as to permit of the pulsator standing between them. One cow is roped on the off leg, and the other on the near leg; any ordinary form of bail is suitable. While being milked the cows stand much quieter than when being milked by hand, and most of those who have used the machines seem to agree that the milk flow increases when the machines are used.

Mr. Burt Davy, Agrostologist of the Transvaal Department of Agriculture, has recently been on a visit to the United States. Interviewed in England, prior to leaving for South Africa, he said he was well satisfied with the results of his tour. He has secured new American varieties of mealies, from which he hopes to raise a variety suitable to the coldest parts of the veld. He has also obtained some valuable pasture grasses from the South-West United States and from Algeria. According to *Reuter*, he hopes to induce the Transvaal Government to purchase a stud flock of a species of Algerian sheep suitable to South Africa. He was much impressed with American methods of agricultural research, which he recommends to the attention of South Africans.

The Scale Insects, Bark Lice and Mealy Bugs.

By CLAUDE FULLER, Government Entomologist.

No family of insects contains a greater number of pernicious species than does this. In every country, by far the most troublesome pests to fruit trees and garden plants are scale-insects of one kind and another. Within recent years, owing to the rapid communication established between the continents of the world and the consequent interchange of living plants, the kinds native to one country have been carried to and acclimatized in another. Thus, the more destructive and common species in South Africa are not indigenous, but have been brought here from Europe, America and Australia. In America we find that many of the destructive kinds have come from Europe, Asia (chiefly China and Japan) and from Australia. In Australia those which are the most destructive are introductions from Europe, Asia and America.

In South Africa there are many native scale-insects which infest indigenous plants, but which are not troublesome to cultivated sorts. This, to a great extent, is practically true of most countries. In Australia none of the native species are particularly troublesome, and yet from there was spread to Europe, America and Africa a scale-insect (the Cottony Cushion Scale—see coloured plate; fig. 6), where, for a time, it accomplished as much damage as any scale insect upon record. In fact, until the natural agencies which hold it in check in Australia were introduced into these other countries, its effect was devastating.

It is because so many scale-insects are carried abroad without their natural checks that they become aggressive parasites. If this held good in every instance it would only be a question of introducing the natural enemies from the original habitat to deal effectively with every one; but, unfortunately, it does not always so hold, for there are other reasons and other factors which contribute to the ascendancy of particular species. In fact, certain of the more destructive with which we have to contend in Natal, can only be controlled by thorough and continuous mechanical efforts.

The scale-insects are modified plant-bugs, characterised by suctorial mouth-parts by the means of which they imbibe the juices of plants. These juices are their only form of nourishment, and when deprived of the opportunity of feeding upon the living juices of such plants as they have become adapted to, the insects die.

The common appellation of "scale-insect" is derived from their scale-like nature. Another title is "shield-lice": this refers to the small waxy pellicles or shields which many secrete over their bodies for protection. A third is "bark-lice," but this is not a very expressive term as they are as often found on foliage and fruit as on the bark. The term scale-insect is preferable, because it applies to those which secrete shields equally as well as it does to a great many which do not. None of the terms applies to a large number which cover their bodies with meal (mealy bugs), or cotton-like secretions, although these are generally spoken of in popular parlance as scale-insects.

Although belonging to the great bug family (which is characterised by a resemblance between the immature and the adult insects, as opposed to the marked difference between these stages in some other groups), they exhibit in their life-history abnormal developments. The larvæ are minute creatures which for a little while lead an active life, wandering about the fool plant upon which they have come into existence. In the ordinary course of events they select a suitable spot, insert the proboscis, and settle down. It is whilst in this active stage, however, that they are spread about in an orchard or plantation of trees. From many studies of their habits it is concluded that this is never done voluntarily, but always accidentally. One factor in the dissemination of active larvæ is said to be the wind, and there are possibilities of such happening; upon the whole, however, the winds do not play so important a role in this connection as is usually ascribed to them.* It more frequently happens that, in cultivating the orchard and in gathering the crop, the young are carried from tree to tree. Other agencies are birds and flying insects. The young scales crawl on to these when they are resting upon a tree and are accidentally carried further afield: the chances of them gaining a suitable host by this means are, on the whole, very meagre. The Orange-Butterfly (*Papilio demoleus*) appears, however, to be an active agent in the distribution of scale-insects affecting citrus trees.

Having settled down to feed, the young insect grows apace, and, if it belongs to the female sex, as a general rule, ultimately becomes inert, losing all its functions except those of feeding and reproduction. Should it be a male, it changes after a while into a pupa or chrysalis, and ultimately emerges as a two-winged fly. The males of all scale-insects with a few remarkable exceptions, are quite microscopic in size, and so never come under observation. (See coloured plate; fig. 5, a male coccid, greatly magnified.) Their adult life is but very short, for they are mouthless and

* There are certain scale insects which in their larval stage are covered with long silky hairs, and it is assumed that these lend themselves to aerial transportation. Most of these are not met with in ordinary orchard and garden operations. One species (*Lophococcus mirabilis*, Ckll), common on the wild mimosa, seems to lend itself to this form of distribution.—C.F.

so unable to feed. Their power of flight is to assist them in the pro-creative object of their existence. The males of many kinds have never been observed; and, as these are among some of the common and more destructive forms, one can only conclude that the reproduction is asexual, as is the case with the aphides or plant-lice.

In nearly all cases female scale-insects are oviparous, that is, they deposit eggs; there are some exceptions, such, for instance, as the Common Red Scale, which gives birth to living young, or to be more correct, the eggs hatch directly they leave the maternal body. The different kinds discussed below fall into the several more or less natural groups in which they have been arranged. The first group contains the "shielded" scales, or those which protect themselves with a covering of stiff horny or papery texture. This group is divided into two sections, the first comprising those in which the shield is more or less circular in outline, and the second, those in which it is elongated or mussel-shaped. (See plate and compare figures 1 and 8.) The second group contains the naked scales, which secrete no protective envelope or shield; the third those which have a mealy coating; the fourth those making cottony envelopes or sacs; and the fifth those having a coating of thick wax over the body.

In Natal it is chiefly among citrus trees that scale-insects are troublesome, other fruit trees being practically exempt from attack. The White Scale of the Peach, which has been so troublesome in the Cape and other countries, has during the past seven years that it has been under observation shown no evidence of becoming widespread or destructive. Similarly the Greedy Scale though at times found abundantly on English gooseberries, euonymous and several other plants has never increased sufficiently to be destructive to pears and plums which have been infested for years. Several others of the species discussed later, which are admittedly destructive, have never as yet been responsible for conspicuous mischief. The Circular White or Oleander Scale, the Tea Scale, the Green Scale of coffee, Ross' Black Scale, the Pineapple and Sugar Cane Mealy Bug, the Australian Bug, the Sugar-Iced Bug (*Orthezia insignis*), and the Wax Scales (*Ceroplastes*) all come into this category. The notorious Black Scale (*Lecanium oleae*) has only come under notice in an orchard once, and then upon a young orange imported from the Cape Colony, which since its treatment has not been re-infested.

It is well recognised that a periodicity is to be noticed in the occurrence of scale-insects in injurious numbers, and because of this fact alone orchardists must take cognisance of the species which are present because their power for mischief may as yet be latent from some unascertained cause, and this in time may be removed. In a few words, the two scale insects of citrus trees, the Common Red Scale and the Common Mussel Scale, may be said to be at their maximum for mischief in this Colony, and this is entirely due to consistent neglect. Perhaps nowhere in the

world have citrus fruits been grown commercially with so little attention as they have received in the past in Natal—and this accounts for the ascendancy of the pests. At the same time even these insects are worse at one time than another. Nowadays, it is true, the culture of these fruits is obtaining more attention and care, but if success is to be ultimately attained much more general attention will have to be given in the future, particularly to these two pests. Unthriftness in a tree is a very potent factor in the ascendancy—or the numerical increase and consequent damage—of scale-insects. Stock-owners realise more than anyone how subject an unthrifty beast is to ticks; one can lay down no definite explanation of this phenomenon, but it may be accepted as a law of Nature. A scale-insect is simply a pumping machine drawing into its body the juices from the fruit, foliage or bark as the case may be. Individually the damage accomplished by one insect is infinitesimal, but multiplied by millions it becomes such a drain that the tree cannot stand against it and flourish. Scale-insects seldom kill trees outright even at the worst of times, but they can render a tree to such a state that it becomes nothing but a machine obtaining from the soil and preparing food to the insects' taste. Apart, however, from draining the sap there is a certain amount of damage done which can only be described as poisoning. The Red Scale undoubtedly "poisons" rose-bushes, and a similar effect can often be traced to other scale-insects.

The first essential to the successful control of this group of pests is to get the trees into vigorous growth, and vigorous growth can only be attained by care and culture. None but vigorous young trees should be planted in the first instance, and by cultivation, manuring and pruning they must be kept in prime condition—otherwise the increase of their parasites is countenanced and encouraged. As with ticks and a healthy beast, so with a tree there seems to be something repellant to scale-insects in the sap of a vigorous tree, something which "throws them off." In the case of citrus trees, nothing has been, nor perhaps is, more neglected than pruning. Few citrus trees receive regular, careful and thoughtful pruning, and as a consequence became dense and close-headed. From the interior of such, light is shut out and there the air stagnates. Such conditions are conducive to the increase of the scale-insects and their well-being; furthermore, such conditions minimise the effect of any treatment to an enormous extent.

TABLE OF SPECIES DISCUSSED.

GROUP I.—SHIELDED SCALE-INSECTS.

Section A.—Shield of female, circular; of male, oval.

Common Red Scale.

Chrysomphalus aurantii (Maskell).

Circular Purple Scale.

Chrysomphalus aonidium (Linneus);
syn. *Aspidiotus ficus*.

Section A.—Shield of female, circular; of male, oval.—(Continued).

Circular White Scale.	<i>Aspidiotus hederæ</i> (Vall); syn.
	<i>Aspidiotus nerii</i> , Bouche.
The Greedy Scale.	<i>Aspidiotus rapax</i> , Comstock.
Chaff Scale.	<i>Parlatoria pergandii</i> , Comstock.
The Tea Scale.	<i>Selenaspis articulatus</i> (Morgan) ?
Ross' Black Scale.	<i>Chrysomphalus Rossi</i> (Maskell).

Section B.—Shield of the female, circular or oval; of the male, oblong.

The Pineapple Scale.	<i>Diaspis bromeliæ</i> (Kerner).
White Peach Scale.	<i>Aulacaspis pentagona</i> (Targ).
The Mango Scale.	<i>Phenacaspis natalensis</i> Ckll.

Section C.—Shields "mussel" shaped.

The Common Mussel Scale.	<i>Lepidosaphes beekii</i> (Newm); syn.
	<i>Mytilaspis citricola</i> .
Glover's Mussel Scale.	<i>Lepidosaphes Gloverii</i> (Pack.).

GROUP II.—NAKED AND SOFT SCALE-INSECTS.

The Soft Scale.	<i>Coccus</i> (<i>Lecanium</i>) <i>hesperidum</i> (Linneus).
The Fern Scale.	<i>Sassetia</i> (<i>Lecanium</i>) <i>hemishaerica</i> (Targ).
The Coffee Green Scale.	<i>Coccus viridis</i> (Green).

GROUP III.—MEALY COATED SCALE-INSECTS.

The Common Mealy Bug.	<i>Pseudococcus longispinus</i> (Targ).
The Pineapple Mealy Bug.	<i>Pseudococcus bromeliæ</i> (Bouche).
The Orange Mealy Bug.	<i>Pseudococcus</i> , sp.
The Araucaria Mealy Bug.	<i>Pseudococcus auarulanatus</i> (Mask).
The Cochineal Insect.	<i>Dactylopius coccus</i> .
The Sugar-iced Bug.	<i>Orthezia insignis</i> .

GROUP IV.—COTTONY AND FELTED SCALE-INSECTS.

The Australian Bug.	<i>Icerya purchasi</i> (Maskell).
The Norfolk Island Pine Felted Scale.	<i>Eriococcus araucariæ</i> , Maskell.

GROUP V.—THE WAX SCALES.

Ceroplastes, spp.

GROUP I.—SHIELDED SCALE INSECTS.

SECTION A.—SHIELD OF FEMALES CIRCULAR, OF MALES OVAL.

THE COMMON RED SCALE.

Chrysomphalus aurantii (Maskell).*Coloured Plate: figures 3 (on fruit natural size), 4, 4a, 4b and 5.*

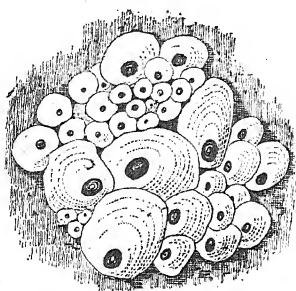
Probably no other scale-insect does more damage to cultivated citrus trees throughout the world than this "Common Red Scale." It flourishes upon many other plants too numerous to detail here, and is particularly harmful to certain kinds of roses. So far as Natal is concerned, it may be said to confine its mischief to citrus trees and to roses. Occasionally it has been found upon the apple, pear, grape and privet, but never to any alarming extent. Its mischief in the Colony is chiefly confined to the midlands and such parts of the highlands as are suitable to citrus culture. It is often met with on the coast-belt upon roses, and but rarely upon citrus trees. This is chiefly attributed to the uncongenial humid atmosphere of the coast, and also to the fact that its natural enemy, a red parasitic fungus (*Spaerobastibile coccophila*), has a more destructive effect than is possible upon the drier midlands.

The female, shown natural size on the fruit figure 3 and enlarged at figure 4a (coloured plate), is easily recognised by its circular outline and its yellowish-red or brownish-red colour. It is flat, except for a nipple-like prominence or boss in the centre, and is about the size of a pin's head. As it appears upon the foliage or fruit, only the enveloping shield is seen by the eye, and this owes most of its red colour to the insect within it. Not only does this insect protect its back with a very effective shield, but it also secretes another strong one beneath it, so that it is completely encased. Removed from its envelope, the female is remarkably kidney-shaped and of a dull orange colour. (See enlarged sketch, fig. 4 of plate.) Unlike many other scale-insects, the Red Scale produces its young alive. This fact, and the construction of the shield, are two considerations which play an important part in the economic treatment of the pest.

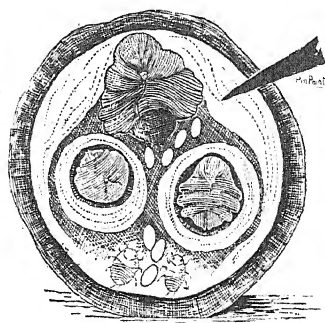
The adult male is a microscopic fly (shown greatly enlarged at fig. 5 of the coloured plate). This creature comes to maturity beneath the male shield or puparium. The male shields can be easily picked out, being smaller than those of the females and more oval in outline (see coloured plate, fig. 4b). The young are microscopic creatures, of a yellow colour and active habits.

Treatment.

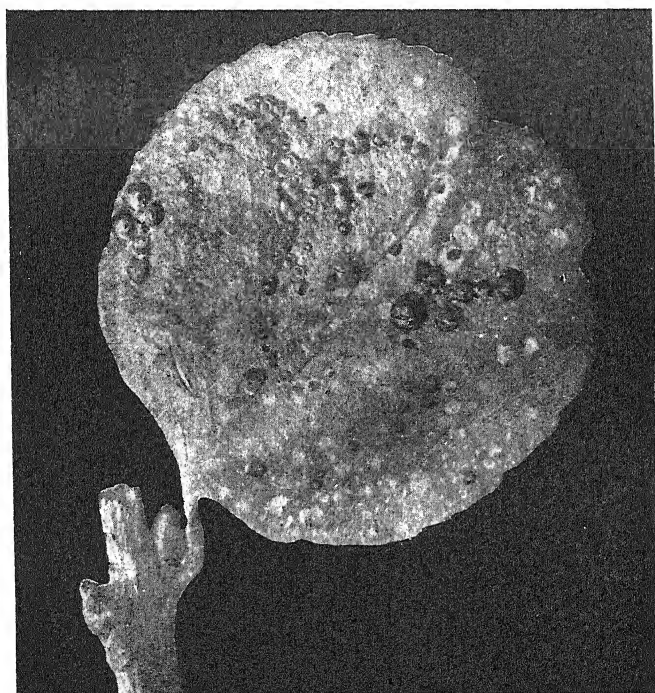
The treatment of this pest is entirely one of control, and no grower of citrus fruits need look to its absolute eradication. Its extermination, in common with that of other scale-insects, may be regarded as impossible, so



THE GREEDY SCALE.
Group of Greedy Scale as seen
under the magnifying glass.



THE GREEDY SCALE.
Adult Female Scale lifted with a pin
point and showing parent, eggs and
young scales.



ROSS' BLACK SCALE
On leaf of Euonymus, slightly enlarged.
(Owing to the high lights the dense blackness of the scales does not
show up in the photograph.)

far as the whole Colony is concerned. Certain districts, favourably located and where interests are undivided, might, by strenuous efforts, be practically freed of such pests; but the present stage of the Colony's development and the status of the interests involved, render such a proposition impossible in actual practice. But this pest can be suppressed and kept under control by fumigation with hydrocyanic acid gas. The treatment must, however, be continuous. Once the scale is under control, it can be kept so, both well and profitably. In a few words, a tree that is not worth keeping clean and vigorous is not worth having. The citrus grower is strongly recommended to suppress all plants, other than those he is commercially interested in, which become infested with Red Scale; and, most particularly, is he advised to destroy all rose-bushes subject to attack. Next to fumigation, spraying with resin wash is the best treatment, and it will be found more efficacious than the more readily prepared paraffin emulsion, and the various nostrums occasionally recommended by the ignorant.

CIRCULAR PURPLE SCALE.

Chrysomphalus aonidum (Linn).—*Aspidiotus ficus*.

Coloured Plate: Figure 7 (shown in company with Mussel Scale).

This scale-insect resembles in size and shape the Common Red Scale, but it is of an opaque black-purple colour, with a bright-red central nipple. At figure 7 of coloured plate it is shown natural size upon the rind of an orange, associated with the Common Mussel Scale. It is very distinct and easily recognised species, which is not uncommon on citrus trees, ornamentals and palms in the coastal region. It appears confined to the lower elevations and is seldom found upon orange trees in the midlands and uplands. If allowed to go unchecked it rapidly infests the whole tree and becomes very mischievous. The scale or puparium of the male is smaller than the scale of the female and is oval in outline; resembling that of the Red Scale except in its dark colour.

The immature scales are circular and black, resembling raised fly specks.

The female insect, which can be easily observed if the shield is upturned with a pin's point, is of a light yellow colour, and more or less pear-shaped. It is not protected so thoroughly as is the red scale, there being no strong scale secreted between the body of the insect and the surface to which it is attached. The eggs are deposited beneath the shield about the parent, and young insects may also be observed in the same position.

The attack of this insect renders both foliage and fruit of the orange very unsightly, the leaves turning a sickly yellow colour. Palms are particularly subject to its attack, and it is occasionally met with on various other plants.

Treatment.

Owing to the slight protection afforded to the female by the covering, the control of this pest is not difficult. It succumbs readily to fumigation, and spraying with either resin wash or paraffin emulsion is very efficacious.

THE CIRCULAR WHITE SCALE.

Aspidiotus hederæ (Vall).—*Aspidiotus nerii* Bouche.

Coloured Plate, figure 8.

This is very often referred to as the Oleander Scale, but is not often seen upon that plant in Natal. Upon the whole it is of rare occurrence, and has only been occasionally noticed upon common rough lemons. It is shown natural size at figure 8 of coloured plate. It will be seen that it is a small white or buff-coloured scale. The shield is of delicate texture with a red or yellowish boss or nipple in the centre. The characteristics of the female, male, and young, are similar to those of the two previously mentioned scales.

Amongst other plants upon which it has been found locally, mention may be made of the ivy, wattle (*Acacia mollissima*) and Grevillia (*G. robusta*).

Treatment.

Fumigation or spraying with either resin wash or paraffin emulsion.

THE GREEDY SCALE.

Aspidiotus rapax Comstock.

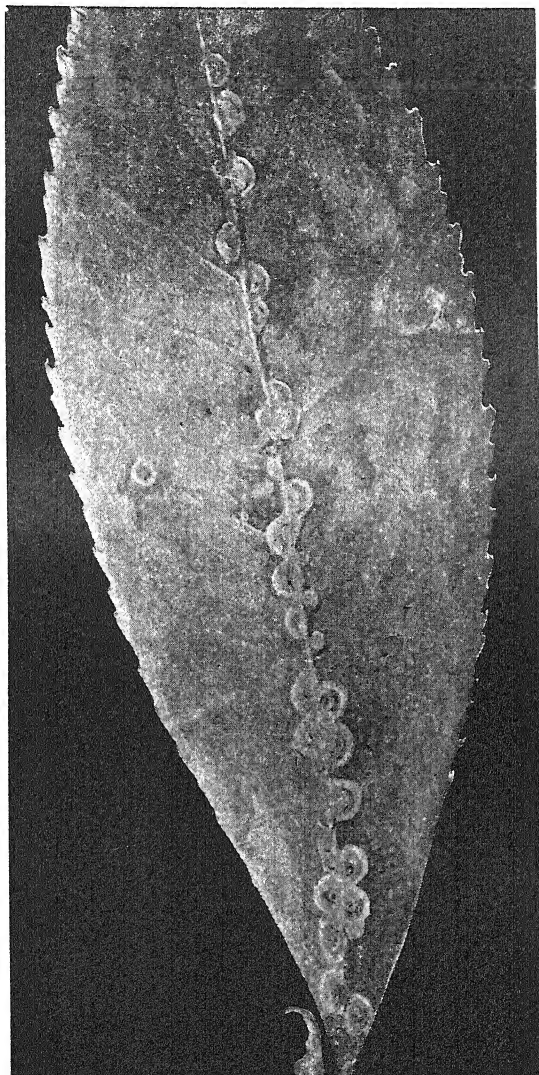
Plate II.

This pest obtains its popular and technical name from the fact that it infests so many different kinds of plants. In Natal, however, it is not common and is seldom abundant. Its attack is chiefly confined to pears and wattles, but has never been found to assume an aggressive or destructive form. Affected pear trees, under observation, on and off, for the past six years, are no more infested now than when first observed. In Ceylon the species attacks the tea plant.

The shield of the female, when fresh, is white, but subsequently becomes a dirty grey colour. It is circular in outline, very convex, and has a greenish or grey nipple to one side of the centre. That of the male is small and oval in outline. The female is easily observed by upturning a scale. It is shaped like a peg-top and of a reddish or yellowish colour. Beneath a single scale, eggs and young can both be found often together with half-grown insects already constructing coverings. As a rule, these scales are massed together, often one on top of another, and are generally located in a crevice or in the axils of leaves and buds. Japanese plums are sometimes slightly affected.

Treatment.

This is a very easy insect to destroy, and it yields readily to sprayings with paraffin emulsion or resin wash.



THE TEA SCALE.

Tea leaf showing scales clustered along mid-rib.
(*Enlarged.*)

GROUP I., SECTION B.—SCALES OF FEMALES CIRCULAR, OF MALES OBLONG.

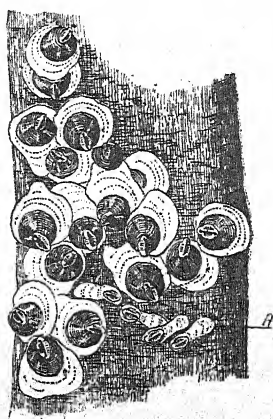
THE CHAFF SCALE.

Parlatoria pergandii Comstock.

This scale-insect has been named after Mr. Pergande, of the U.S.A. Department of Agriculture, and is sometimes popularly spoken of as the "Chaff Scale." It is mentioned here because it was once noticed upon citrus trees in Durban. Upon oranges imported from the Mediterranean it was often common, and it is supposed to have been introduced directly to the premises where it was found on such fruit. Owing to representations made by the writer, this centre of infection has been eliminated.

THE CHAFF SCALE.

Group of Females and (A) Males of the Chaff Scale as seen under the magnifying glass.



The shield of the female is somewhat elongated, but is practically circular with a yellow boss to one side of the centre. Generally speaking the colour of the scale is grey, but it occasionally has a purplish tinge. It is flat and thin. The female is pear-shaped, the body of a purple colour, and the "tail" plate yellow. The eggs are also purple. The shield of the male is small, somewhat oblong, and of a greyish or dirty white colour.

Treatment.

Owing to the small protection afforded the insect by the thin pellicle with which it is covered, ordinary washes will give good results. Fumigation is, however, the best treatment.

THE TEA SCALE.

Aspidiotus articulatus Morgan?*

Plate III.

Mention is made of this species rather as a matter of interest than otherwise. It is not infrequently met with on individual tea plants grow-

* There is some doubt as to whether this is *articulatus*, as the articulate character is absent from the adult females.

ing in gardens at the higher elevations of 2,000 to 2,500 feet. It has also been taken in abundance on a row of lemons running through a tea plantation on the Lower Umzimkulu. In company with the Red Scale and Ross' Black Scale, it is also common upon *Acacia melanoxylon* in the streets of Maritzburg. Specimens of it upon this plant have also been received from Cape Colony. At times the scale is easily mistaken for the Red Scale, particularly on the wattle mentioned.

The shield of the female is circular, pale brown, and frequently almost white with a brownish red central area.

So far as appearances go this scale-insect does not seem to be a destructive species.

ROSS' BLACK SCALE.

Plate II.

Chrysomphalus Rossi Maskell.

Ross' Black Scale is often confused with the Circular Purple Scale of the orange mentioned previously. It is very readily distinguished, however, by the absence of the central red boss and the more opaque black colour of the shield. It is a common species on the wattle *Acacia melanoxylon*, ivy, cammelia, and *Euonymus*. On the last-mentioned the shield is more intensely black and opaque than on other plants. The species is not known to attack fruit trees.

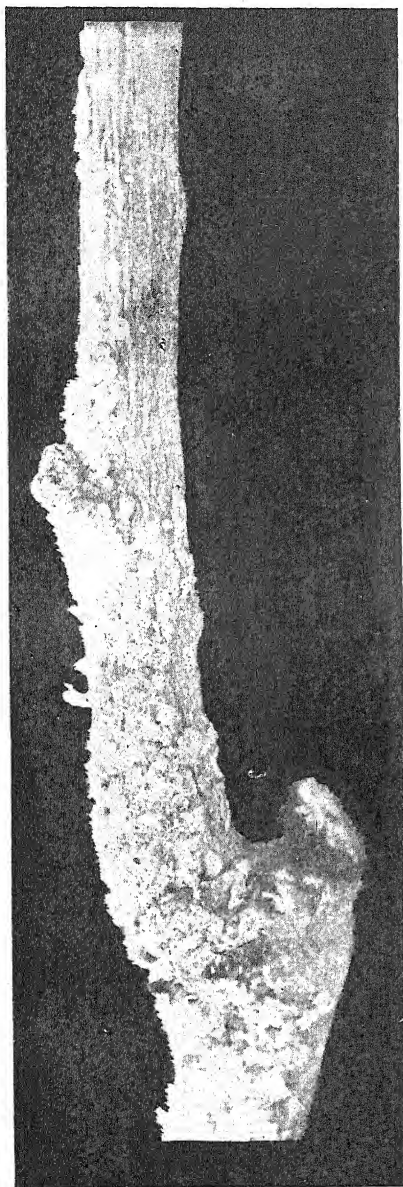
Treatment.—Spraying with resin wash or paraffin emulsion.

THE PINEAPPLE SCALE.

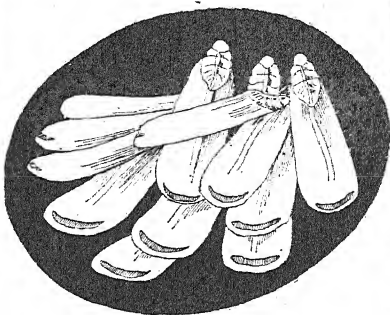
Diaspis bromeliæ (Kerner).

This is an important and destructive pest, the proper control of which is essential to successful pineapple growing. It is said, on good authority, to have been introduced into Natal upon imported plants of the "Smooth-leaved Cayenne," about 1894, from Maderia. It rapidly spread to the "Queen" pines, upon which it appears to have a very pernicious effect, killing the plants in a season or two. Although by no means a rare scale-insect, and often abundant in old pineapple patches, it has not done the damage anticipated from it; this is doubtless due to the attention given by growers in selecting and treating plant-suckers and in growing the two varieties well apart.

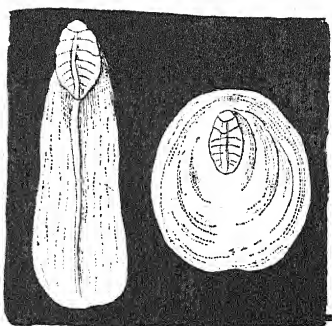
Owing to the white colour of the scale, the pest is easily recognised among the various scale-insects common to fruit plantations on the coast. The effect of the insect, even when isolated upon the blades, is very marked, the tissue turning brown. Where several are clustered together they rapidly destroy the tissue, causing the formation of a discoloured spot where decay will ultimately set in. As a rule, the insects infest the basal areas of the blades and get around the stem. Occasionally a whole blade is infested and the fruit is also attacked. Whilst the insect has a most destructive effect upon the blades, it does not affect the fruit to any



Peach Twig badly infested.
(*Photo enlarged.*)



Group of Male Puparia.
(*Much enlarged.*)



Shields of Male and Female compared.
(*Much enlarged.*)

THE WHITE PEACH SCALE.

extent, except a white marbling of the skin round about where it is located. At times, the species displays a habit of congregating in patches across a blade, bringing on a very curious effect for a scale-insect. The area attacked dies. The flow of sap being cut off, the upper part of the blade follows suit, but as this does not occur at once, the toppling over of the upper end becomes a marked characteristic of the trouble.

Two very distinct forms will be noticed in examining an affected leaf. One is comparatively large and circular, the other small and oblong. The former is the scale of the female and the latter that of the male. The shield of the female is greyish white and somewhat opalescent, with a pale yellow spot near the centre. It measures from one-twelfth to one-tenth of an inch in diameter and is very flat and thin. According to several descriptions of this pest the adult females "burrow beneath the epidermis of the plants and become almost entirely hidden." If the insects are examined with a magnifying glass this certainly appears to be the case; but the readiness with which the scales flake off shows the effect to be only apparent, not real. The appearance is due to the incorporation of the hairs and loose particles superficial to the epidermis of the pineapple leaf into the covering shield.

The shield of the male insect or the puparium, in which it transforms into a minute two-winged fly, is small and marked with several parallel ridges running from end to end. At one end may be seen a yellow boss; this is the skin cast off by the insect on transforming from a larva to a pupa.

Treatment.

Infected areas should be thoroughly attended to. If the patches are old and played out the plants are best rooted out, heaped, and burnt upon the spot. Otherwise they should be regularly sprayed with paraffin emulsion or with resin wash. Planting adjacent to infested plants should be avoided. Great care should always be taken to select only clean suckers for planting, and all suckers should be treated as a precautionary measure before setting out. They may, with advantage, be either fumigated in hydrocyanic acid gas or dipped in paraffin emulsion.

WHITE PEACH SCALE.

Aulacaspis pentagona (Targ.).

Plate IV.

This insect is not generally destructive in the Colony, nor is it very widespread. Individual trees, badly infested, are occasionally met with in the midlands, but they are, upon the whole, neglected seedlings. No instance of gross infestation has come under notice in the case of a number of cultivated trees. The insect has been noticed upon "Cape gooseberries," the mulberry, grape, passion vine (grenadilla), and geranium. To the passion vines, both the edible and flowering kinds, a good deal of damage is

often done in isolated cases, and in this connection only it is to be regarded as a serious pest.

The shield of the female is nearly circular, flat and quite white, except for a yellow or reddish-yellow nipple to one side of the centre. The female itself and its eggs are bright yellow or red. That of the male insect is characteristic, being oblong in shape, with a ridge or keel along the middle and with a yellow boss at one end; as a rule these are thickly massed together, and the affected parts of the plant appear as if clothed with a snow-white woolly-felt.

Treatment.

The best treatment for peach or other deciduous trees is winter spraying with the lime, salt, sulphur mixture. Not only does this treatment destroy the insect, but it also kills lichenous growths and the wintering spores of parasitic fungi. Summer treatment is not recommended; but, where necessary, spraying with paraffin emulsion will prove most satisfactory.

Affected geraniums and gooseberries are best cut down and burnt.

The treatment of grenadillas is limited to spraying. Experience shows, however, that these vines invariably become infested at the base of the main stem first, and the insects then spread upwards over the vine. The treatment of the pest can therefore be facilitated by training the vines to a clean main stem for, say, 2 to 3 feet, up from the ground. The blight can then be readily detected and easily removed with the aid of a stiff paint brush and thick soapsuds or weak paraffin emulsion. This insect is easily mistaken for *Aulacaspis crawii fulleri* (Ckll), which is very common on the so-called syringa—the white cedar *Melia adzerach*.

THE MANGO SCALE.

Plate V.

Phenacaspis Natalensis Ckll.

This scale-insect is not uncommon upon mango trees in the neighbourhood of Durban and along the coast. In general appearance it greatly resembles the White Peach Scale mentioned above, from which it differs only in microscopic characters. This insect is supposed to be indigenous to the Colony, as its technical name *Natalensis* indicates. Its native host is probably the Amatungulu (*Carissa grandifolia*), which is often affected by it.

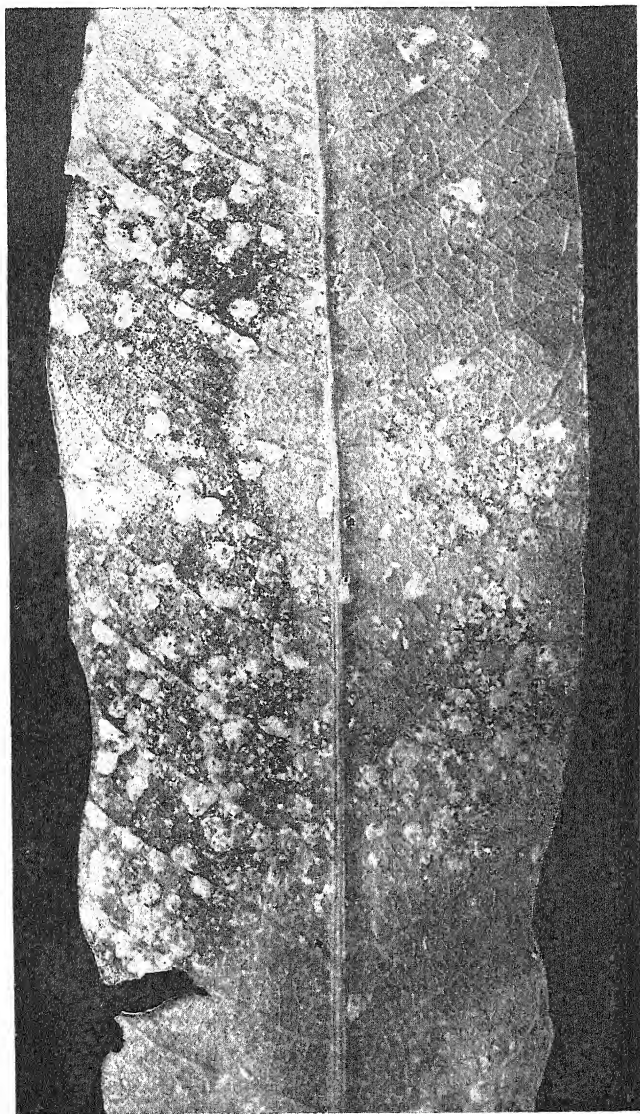
GROUP I.—SECTION C. SHIELDS, MUSSEL-SHAPED.

THE COMMON MUSSEL SCALE.

Lepidosaphes beckii (Newn).—*Mytilaspis citricola*, Packard.

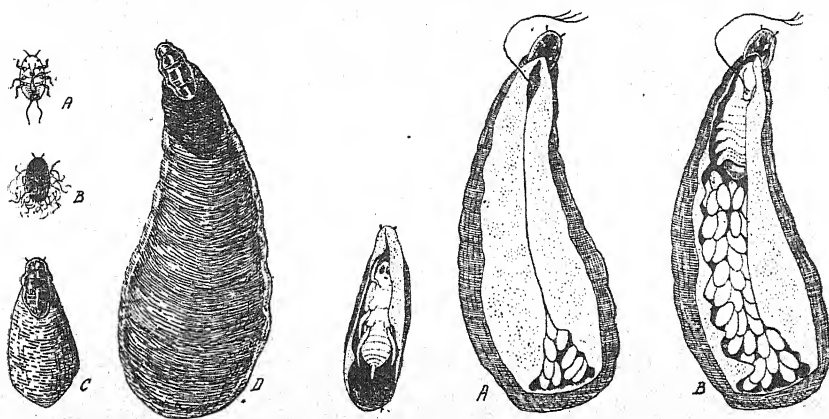
Coloured Plate, figure 1. 1a and 7.

The Common Mussel Scale is essentially a coast pest in Natal, being confined to the coast orchards and only flourishing in the warm kloofs of



THE MANGO SCALE.
(*Photo enlarged.*)

the midlands,—such as the Chase and Town Bush Valleys, near Maritzburg,—where the warm, humid, coast conditions prevail. It is the most serious pest of citrus culture in the Colony, and has been allowed to gain an unpardonable ascendancy in many orchards. It is capable of reproducing rapidly and enormously; and neglected, uncultivated, or drought-stricken trees suffer terribly from it. Whilst the species will infest other plants than those of the citrus family, it is only on very rare occasions that any other plants have been found affected by it, and then when growing in close proximity to scale-ridden orange trees.



THE MUSSEL SCALE.

A—Active larva. B—Larva beginning to secrete its scale.
C—Halfgrown Femalescale.
D—Full grown Female scale.

(All considerably magnified.)

A Male scale upturned with half of the ventral shield removed to show the pupa lying within.

(Considerably enlarged.)

A—Female scale upturned to show the lower or ventral shield. B—The same with half of lower shield removed to show Female insect and eggs in position.

(Considerably enlarged.)

The female is shown natural size, in company with the Circular Purple Scale, as it appears upon the rind of the orange, at figure 7 of coloured plate. On the same plate it is also shown natural size on the foliage at figure 1, and an enlarged view is given at 1a. It is a narrow elongated scale, rounded at the posterior end and tapering to the pointed apex. Usually it is curved. Its common name, Mussel Scale, is derived from its general resemblance to the shell of a mussel. When fresh the scales are purplish and often covered with a grey bloom of waxy meal. Old scales are usually brown. At the pointed end is seen a yellow boss formed from the cast skin of the larva. Upon up-turning, the pale-coloured female will be discovered in the pointed end, as shown in the accompanying figure and, behind her, the large cluster of eggs. It will be

noticed also that this species is further protected by an incomplete ventral scale.

The shield of the male is much smaller than that of the female, it is of a dark brown colour, and is usually straight. The pointed end is finished off with the cast skin of the larva, and the posterior end is hinged so that the male, when adult, can emerge readily—backing out, tail first.

Treatment.

The effect of any single treatment of this scale can only be temporary. This can be gathered from the structure of the scale, which is strong, and because of the comparatively large egg cluster. It has been found that, by fumigating infested trees with hydrocyanic acid gas, practically all the living insects are destroyed and also a great number of eggs; but many eggs lying in the centre of the mass are not reached by the gas, and consequently not poisoned. Practically the same holds good with the application of liquid insecticides such as Paraffin Emulsion and Resin Wash. For general treatment, regular spraying with the latter wash is recommended.

Where fumigation has been adopted the immediate results have been excellent, but it is found that after a few weeks the eggs which have escaped poisoning have provided a fresh batch of living insects. Conceivably, two successive fumigations, with an interval between of three or four weeks, would prove an ideal procedure; but the great expense entailed, where a large number of trees have to be dealt with, and with the chance of re-infestation from external sources so great, places such a course beyond the means of most citrus growers.

Where trees are very badly infested, fumigation is recommended in the first instance, and spraying relied upon for the subsequent control of the pest. For trees in ordinary vigour, the careful pruning out of thorns and dead or useless inside growth, coupled with good culture and manuring, are to be recommended. Upon the whole, Resin Wash should be used for winter treatment, and Paraffin Emulsion for summer application.

GLOVER'S MUSSEL SCALE.

Lepidosaphes gloverii (Pack).

Coloured Plate, figures 2 and 2a.

This scale-insect is named after Glover, who first drew attention to it in America. It is of rare occurrence in the Colony, and has only been observed in Stanger. In most respects it is like the Mussel Scale, but is much narrower, and of a light brown or straw colour. The female scale is shown natural size at figure 2, and enlarged at 2a on coloured plate. The treatment of this pest is similar to that of the Mussel Scale.

GROUP II.—NAKED AND SOFT SCALE INSECTS.

THE SOFT SCALE.

Coccus hesperidum (Linneus).

Coloured Plate: Figure 3 on Stem and Leaves.

Although not so generally distributed as either the Red or Mussel Scale amongst citrus orchards, the Soft Scale ranks third in importance as a citrus pest in the Colony. To a very great extent its increase is controlled by a minute wasp, parasitic upon it. Upon the whole it is more common upon the mandarine oranges (or naartjes) than other members of the group. Whilst its effect cannot be described as destructive or inimicable to the vigour of the trees, still its presence depreciates the market value of the crop. The foliage and fruit of trees affected with this insect are often coated with a black, sooty layer (see figure 3 of coloured plate). If this substance is examined it will be found that it peels from off the fruit or leaf very readily, leaving the surface thereof uninjured. Microscopic examination shows that the sooty layer is composed entirely of a fungus growth, and this is known as *fumago* or *fumagine*. The existence of the fungus is entirely due to the presence of the Soft Scale.

In treating of aphides, mention has been made of the sweet liquid or "honey-dew" produced by certain species. This peculiar habit is also common to certain scale-insects, particularly this species which ejects honey dew, which falls upon the upper surface of fruit and leaves and there forms a sticky layer. In this the fungus grows. Therefore, where there is no Soft Scale there will be no Sooty Mould upon a citrus tree.

The Soft Scale differs essentially from those discussed above, inasmuch that it does not cover itself with a separable protecting shield or scale. To a certain extent the absence of such a form of protection is provided for by the hardening of the back, but this does not occur until the insect is mature. The males of this species have not been discovered, and consequently the insects must propagate agamically—that is, without the intervention of the male, an occurrence which is common amongst the aphides.

Figure 3 of the coloured plate shows the sooty mould on fruit and foliage of the mandarine orange, and the pest itself is indicated at about natural size upon a twig. The full-grown insects are about one-twelfth of an inch in length, wide and oval in outline, and quite convex. The margin of the body is flattened and "clings" to the surface of the leaf or twig. The colour is dark brown and faintly mottled. The young are produced alive, and numbers of them may often be found beneath an adult scale. They are small, oval in outline, and yellow. As they increase in size they become light brown in colour and retain their activity or power of locomotion much later in life than do the species discussed in Group I.

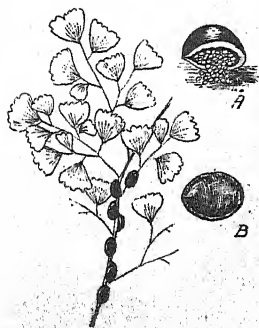
Treatment.

Fumigation and successive sprayings with Paraffin Emulsion or Resin Wash.

THE FERN SCALE.

Sassetia hemisphaerica (Targ).—Syn.: *Lecanium hemisphaericum* (Targ).

The Fern Scale is very similar in ordinary appearance to the Soft Scale, differing chiefly in being of a much more convex shape when adult, and generally of a lighter colour. It is not by any means a common insect; and the popular name of "Fern Scale" has been selected because it is usually found only upon ferns and greenhouse plants. In fact, it is



THE FERN SCALE.

Cluster of fern scales on frond, about natural size. A—Fern scale upturned. B—Scale as viewed from above (*enlarged*).

only in connection with its attack upon such that it calls for any attention. Its technical name *hemisphaerica* refers to the shape, but when located upon the thin stem of a fern it becomes almost egg-shaped, owing to the manner in which the margins are turned down and clasp the stem. In other parts of the world the pest is known to attack oranges and oleanders, but upon these plants it has never been noticed in Natal. The figure shows the adult females natural size and enlarged.

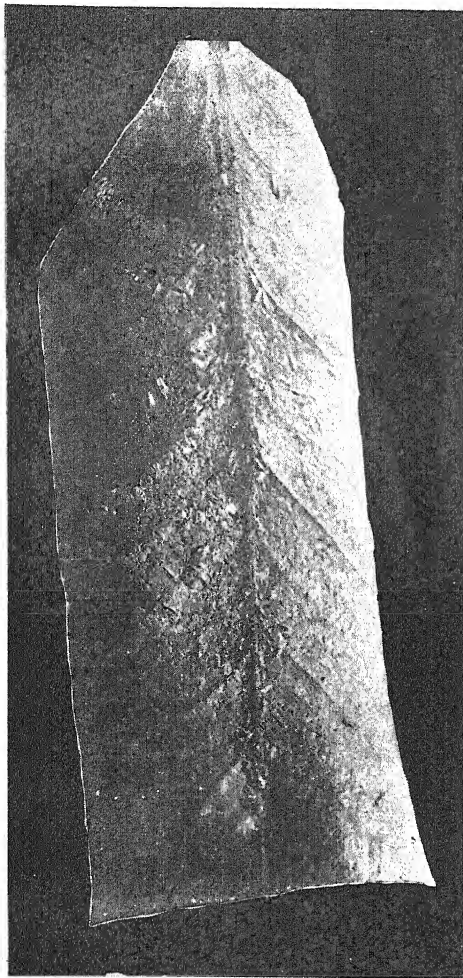
Treatment.

In ordinary cases this pest can be easily destroyed by application of insecticidal washes, but with delicate plants there is a considerable amount of risk attached to such a procedure. A preferable course is to remove the infested parts and burn them; but, when this is not desirable, successive sprayings or syringings with soap wash or soap and tobacco wash should be employed.

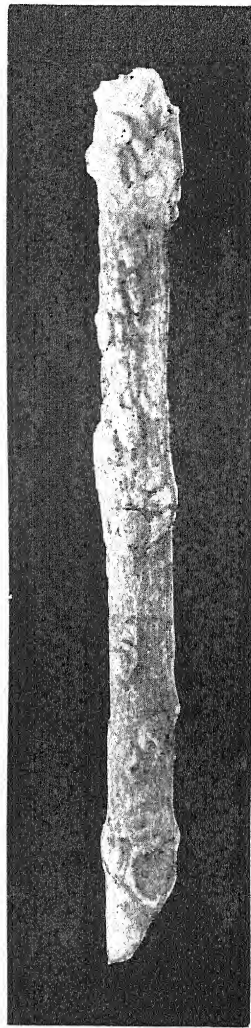
THE GREEN COFFEE SCALE.

Coccus viridis (Green).

This insect is of a very similar nature to the Soft Scale of citrus trees, which it resembles in general except for its clear, green colour. The blight has been noticed upon Liberian as well as Natal coffee, but is not particularly abundant. This is probably due to the effect of the striking



THE COCOANUT SCALE.
(*Fiorinia florina*, Targ.)
On a Camellia Leaf.
(Photo enlarged.)



A MINING SCALE.
(*Chionaspis retigera*, Ckll.)
This Scale Insect mines beneath
the outer bark surface, and is
not easily detected.
(Photo enlarged.)

TWO UNCOMMON CAMELLIA SCALE INSECTS.

fungus parasite which attacks it. The insect affects the under sides of the leaves, locating itself along the mid-rib and veins and also the young shoots, which are often enveloped with them. In Ceylon it is looked upon as a very pernicious species, and, according to Green, "practically responsible for the final abandonment of coffee cultivation over the greater part of the planting districts." The same author says:—

"The bug attacks with indifference both vigorous and weakly trees, but its effect is markedly different in the two cases; for, though leaves of robust trees may become thickly infested by the insects, and blackened by the consequent fungus, they do not fall off, but the plant continues to make fresh growth and retains a fairly healthy appearance. Weakly trees, on the contrary, are almost completely denuded, none but the two or three terminal leaves on each twig remaining. The shoots become dry and hide-bound, and no fresh wood is formed. Naturally such conditions result in the total loss of the crop."

In most cases that have come under notice but a few plants have been found affected, and coffee-growers would be well advised to treat these, because at any time the pest might—in the absence of the fungus disease—spread to a serious extent.

Treatment.—See Soft Scale.

GROUP III.—MEALY COATED SCALE INSECTS.

THE COMMON MEALY BUG.

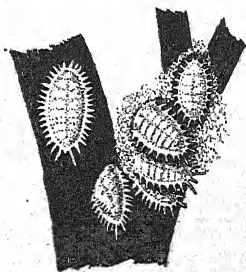
Pseudococcus longispinus (Targ.).

Every grower of plants is acquainted with the flat and oval, floury-white insects known as mealy bugs. As a rule, only one sort is recognised, although, as a matter of fact, there are numerous species. Some are very distinct (such as that described later as occurring on the *Araucarias*), but the majority of the noxious species conform to the well-known type. None is more generally widespread all the world over, nor more omnivorous, than that under discussion. It attacks a great variety of green-house and garden plants, and is often found upon citrus trees, grape vines and the *grenadilla*. It is undoubtedly *the* mealy bug. The female insect is, as

THE COMMON MEALY BUG.

Group of Common Mealy Bugs.

(Enlarged.)



in the generality of cases among scale-insects, the more conspicuous sex. When full-grown it measures between one-tenth and one-sixth of an inch in length; it is oval in outline and somewhat flat. The natural colour of the body is white or yellowish and sometimes brown; but unless the insect is rubbed this is occluded by the fine, mealy coat which covers the back. The margin is fringed with conspicuous white mealy tufts. All mealy bugs retain their ambulatory powers much longer than most scale insects, but, despite this, they do not move about very much. The eggs are deposited partly beneath and partly behind the body, and are covered and entangled with numerous, fine, white threads secreted from pores in the body-wall so that the insect after ovipositing appears as if pitched forward upon a woolly bed (*a tergo*).

Treatment.

The treatment of mealy bugs is not an easy matter, as the mealy coating protects them to a great extent from insecticidal washes. When upon green-house or garden plants, it is far the best plan to remove them as far as possible by hand; and where the plants will stand it a strong jet of water played upon the infested parts helps materially in cleaning them. Upon the whole, the worst cases of attack are found in connection with garden plants, and orchard trees are seldom seriously affected; when they are, several sprayings with Resin Wash or Paraffin Emulsion will give the best results, but care has to be taken that the spray is applied to the insects with plenty of force.

THE PINEAPPLE MEALY BUG.

Pseudococcus bromeliae (Bouche).

This insect does not differ essentially in appearance from the Common Mealy Bug, except that it is occasionally diffused with a light pink colour. It is not of common occurrence in pineries, and could not by any stretch of the imagination be regarded as a destructive species. Growers of pine-apples are, however, advised to keep the pest down wherever it occurs, as its presence upon Natal pines has already been advanced as an argument in favour of excluding them from competition with those grown in Cape Colony.

The insects as a rule frequent the more sheltered parts of the plant and fruit, and their presence is not usually detected until the fruit has been plucked.

Treatment.

If a plantation is already infested, any ordinary treatment is not likely to prove either remunerative nor effective. Care should always be taken in laying out fresh plantations to use only clean suckers; and as a preventative all such should, before planting, be fumigated with hydrocyanic acid gas.

THE SUGAR CANE MEALY BUG.

This insect is not at all uncommon upon sugar cane, but it has never proved harmful. The insects are of the common type, but very much larger and of a pink colour, and usually hidden between the leaf stalks and the stems.

ORANGE MEALY BUGS.

The Citrus Mealy Bugs—for two species, as yet undetermined, have been found on oranges—are both native insects. Of one, no more than a passing reference need be made, as only one infested tree has come under notice. The second species is of the common form, but large and conspicuous, and characterised by the long glassy filaments which clothe the body. What is more interesting, perhaps, is that when about to deposit eggs the insects become more or less denuded of these glassy threads, which become arranged about it and form a nest. The insect is capable of being quite harmful in citrus nurseries, but can be successfully got rid of, Resin Wash proving the best of several treatments.

THE ARAUCARIA MEALY BUG.

Pseudococcus aurilanus (Maskell).

This insect is not uncommonly met with upon the several species of Araucarias grown in the Colony, and has been introduced from abroad upon imported plants. It occasionally appears to be very destructive, but



THE ARAUCARIA MEALY BUG.

Sprig of Araucaria (Monkey's Puzzle Tree) infested with Araucaria Mealy Bug.
(Natural size.)

I find that when such is the case the damaging effect has been intensified by drought.

At first sight the female mealy bug does not appear much like the common type, as its body is black and lacks the characteristic coating of white meal. In size and shape it resembles the common mealy bug, but the body is ornamented with bright yellow tufts of waxy secretion, giving the individual insects a rather pretty appearance. A ridge of yellow tufts runs along the middle of the back from end to end of the body, and a fringe of similar tufts encircles the margin. The female insects are usually found only upon the foliage, whilst the male cocoons are hidden amongst the bark-scales of the tree trunk, away from the females. The eggs are purple in colour, and deposited behind the body in a tangle of woolly secretion. The young when first hatched are of a purple-black colour, but soon after settling down and feeding they secrete conspicuous tufts of yellow wax.

Treatment.

It is scarcely advisable to treat large trees, and nothing more can be done than to keep those affected in vigour with a liberal supply of water. In any case plants are not likely to succumb from the effects of the insect. Care should always be taken to secure clean, young trees for planting in the first instance. Should a young tree be found infested, an effort should be made to rid it of the pest whilst it is still small. Where practicable, fumigation should be resorted to, but upon the whole several sprayings with Paraffin Emulsion will be found very efficacious, and this treatment, if thoroughly carried out, will give a clean tree.

THE COCHINEAL INSECT.

(*Dactylopius coccus.*)

This erstwhile important insect occurs, not uncommonly, on the *Opuntias* or yellow flowering prickly pears in the coastal districts of Natal. It was probably introduced many years ago with its host plant, although no record of its introduction is obtainable. This insect, well known as the *Coccus cacti* of most authors, partakes in general characters of the nature of a mealy bug, the insects when clustered together being masked by a large amount of flocculent, white, waxy threads. The male insect is a microscopic, two-winged fly; the female is quite a large insect of its kind, measuring nearly a quarter of an inch in length and possessing a plump and segmented body.

From this creature, when dried, the beautiful dye known as "cochineal" is obtained. Cochineal is nowadays almost, if not entirely, superseded by the aniline dyes, but formerly it was of great commercial value.

The insect was originally discovered in Mexico by the Spaniards in 1518, where it was then in use by the natives. For nearly two hundred

years the cochineal insect was regarded as a seed of a plant. At one time considerable quantities were imported into Europe, and the annual consumption in England was estimated at 150,000 pounds, valued at £375,000. Seventy thousand insects went to the pound. Subsequently it was successfully introduced into and cultivated in Spain, Algiers, and the Canary Islands.

THE SUGAR-ICED BUG.

Orthozia insignis.

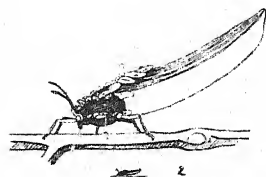
This scale-insect is found either on coleus pot-plants or lantana, to both of which it is particularly destructive. It is also found on one or two other garden plants and weeds. It does not attack any plants of importance and has never been seen on citrus trees. To the grower of coleus plants it is, of course, a pest, but in a sense it may be spoken of as a beneficial insect, for the simple reason that it destroys the lantana, an aggressive weed in many countries.

The insect is of rather handsome appearance, being ornamented with symmetrically arranged plates of white wax resembling the frosting or sugar-icing on a cake.



THE SUGAR-ICED BUG.

Sprig of Coleus infested with Sugar-Iced Bug.
(Natural size.)



The adult Female viewed from the side.
(Enlarged.)



Young Female prior to the secretion of the egg-tube.
(Enlarged.)



Adult Male Insect.



Adult Female viewed from above.
(Enlarged.)

THE SUGAR-ICED BUG.

Unlike many scale-insects, the females are always active, and creep about the plant. They are flat, oval creatures of a dark brown colour, having the margin of the body fringed with white plates which project from each segment of the body, and with narrow white patches arranged in a double row down the middle of the back.

Before ovipositing, the whole character of the female is altered by the secretion, from below the tail end of the body, of a waxy tube which when the animal moves is "cocked-up" somewhat. This tube is flattish, long and narrow and open at its extremity. The sides are parallel and the upper surface handsomely fluted. Into this tube or pocket the eggs are deposited and therein they hatch, the young escaping through the open end and crawling off by way of their mother's body. The males are very rare, only one example having been met with. They are much larger than the general run of male scale-insects, and have a curious tail-brush composed of glassy filaments.

GROUP IV.—COTTONY AND FELTED SCALE INSECTS.

THE AUSTRALIAN BUG.

Icerya purchasi (Maskell).

Coloured Plate: Figure 6 (Natural Size).

The Australian Bug, commonly spoken of in Natal as "Dorthezia," is too well known an insect to call for any description. Figure 6 of the coloured plate shows the mature insect as it appears, together with its conspicuous egg-sac—its best known form.

The adult female is of a dark-orange or brown colour, with black legs and antennae. The back is covered with white or yellowish meal, and the margins ornamented with waxy tufts of fine, white, silken threads. After attaining maturity, the female begins to secrete from the anal region of the body the fluted ovisac which, when complete, may measure a quarter to a third of an inch in length. As will be seen from the illustration, the female remains attached to the anterior end of the sac and stands almost on end, plugging, as it were, the mouth. Inside the sac great numbers of reddish eggs are found; from these the young ultimately emerge. They are small and red, with strong dark-coloured legs and antennae. The adult male insects are seldom observed, being small red flies with a pair of smoky wings.

The Australian Bug is often met with here upon roses, acacias and citrus trees, but very seldom in large colonies, and never sufficiently strong to become destructive. In fact, it is successfully kept in control by its natural enemy, the "Vedalia" beetle. The story of this pest is a long and oft-repeated one, and is very generally known.

The bug was carried from its native habitat, Australia, to many parts

of the world upon living plants, particularly, I believe, Acacias. Introduced into America, New Zealand, South Africa and elsewhere, it rapidly assumed most destructive proportions, attacking citrus trees relentlessly, and causing havoc to the orange-growing industry in California, and great loss to the orange growers of Cape Colony.

In America every effort was made to cope with it; and, from the labours of those working towards its control, both spraying with Resin Wash and Fumigating with Hydrocyanic Acid Gas were evolved. But all measures proved unavailing.

The fact that the insect existed in Australia but caused no damage there whatever, led to an investigation which resulted in the discovery of the ladybird, which is so generally referred to as the Vedalia beetle. To the work of this friendly insect the immunity of Australian citrus trees was due, and its introduction into America and subsequently to other countries where the bug had gained a notorious ascendancy, was followed by the complete subjection of the scale-insect.

Treatment.

In view of the fact that nowadays the bug and its enemy are so rare, it seems almost a pity to destroy the former, because it amounts to cutting off the sparse food-supplies of the beetle. In every case which has come under my observation the Vedalia has put in an appearance sooner or later and destroyed the scale, and consequently its attack need never be regarded with any alarm. If it seems very essential to remove the bug from infested plants, then the best plan is to set a native boy to cleaning it off, cutting out and burning badly infested portions. Before such a course is taken, however, a search should be made to see if the ladybird is present, and if so, then on no account should the bug be destroyed.

NORFOLK ISLAND PINE FELTED SCALE.

Eriococcus araucariae (Maskell).

The presence of this pest, which is common to the several araucarias grown in Natal, more particularly the Norfolk Island Pine, is often first indicated by the black soot-like coating of the green parts. Like many other coccids, this secretes an abundance of honey-dew, and hence the growth of sooty mould.

In discussing other scale-insects, it has been shown that some secrete waxy shields beneath which they live and lay their eggs, others secrete waxy or cottony pockets and place their eggs therein, and some others secrete no envelope but are protected by the hardening of the skin of the back, and deposit their eggs immediately below the body. In the case of this species a slight variation of habit is illustrated. The scale insects are naked until reaching the adult stage, and then secrete a felted envelope which encloses the whole body. In this envelope the eggs are deposited, the



THE NORFOLK ISLAND PINE
FELTED SCALE.

Twig of Norfolk Island Pine infested with the felted scale.
(Natural size.)

body of the female gradually shrinking up in one end of the sac so as to accommodate them.

If a piece of infested araucaria be examined, the scale-insects may often be seen in every stage of development. The young and nearly mature insects are a bright yellow colour and, as a rule, cluster together. Amongst these can be seen the white egg-shaped cocoon (one-tenth inch long) which at a later stage in the attack replace the yellow insects. The male insect when about to pupate envelops itself in a white cocoon similar to that of the female but only about quarter the size.

Treatment.

See remarks on Araucaria Mealy Bug.

GROUP V.—THE WAX SCALES.

Ceroplastes, spp.

This genus of scale-insects is characterised by the consistent coat of wax which clothes the whole of the back of the body. This wax is either pink, reddish or pale yellow or quite white, and is so conspicuous a feature of the insects that a *Ceroplastes* can never be mistaken for any other scale-insect. When the wax is removed a hemispherical creature is exposed which resembles in general form the "naked scales" like that of the fern. As a rule the wax is tough like bee's wax, but in some species it is soft and doughy.

They are of local interest because the well-known wax-insect of the wild thorn tree is used by our natives in preparing the remarkable head-ring of the *Kehla*. This species (*Ceroplastes egbarum* Ckll.) is almost

WAX SCALE INSECTS.

Twig of native shrub infested with wax scales.
(Natural size.)



peculiar to the thorn trees, which are oft-times white with them. Very large, more or less isolated individuals are occasionally met with upon the *Acacia melanoxylon*; and this tree is also invaded by the red variety (*C. egbarum Fulleri*). In no case, however, are these large forms abundant.

The common form of the Thorn tree may have some value as it is related to the "White Wax-insect of China," for which, it is said,* there is a considerable demand owing to its property of "breaking the grain" of otherwise crystalline substances, and thus rendering them suitable for candle-making.

A third wax-insect is often met with upon the Custard Apple, but it is never destructive, being kept sufficiently under control by the caterpillar of a small moth which preys upon it.

The production of cocoa in Jamaica is increasing; and as a considerable number of young plantations, which have been established in conjunction with bananas, is coming into bearing, a rapid development of this cultivation is looked forward to. H.E. the Governor of Jamaica, in his Annual Report for 1905-6 (just published), remarks: "It is to be regretted that a still larger proportion of the banana growers do not adequately realise the profitable opportunity which in so many places offers for establishing cocoa, almost free of cost."

* Indian Museum Notes II. 3, 1891.

Alcohol as a Source of Power.

By WALTER H. PAY, F.C.S., Member Soc. of Chem. Industry.

IN view of the depletion of live stock in this Colony during the past year and the consequent loss of tractive power, it has occurred to me that a few remarks on "Alcohol as a source of power" may prove interesting to the readers of this *Journal*.

In the first place alcohol may be defined as that substance known as ethyl alcohol, hydrated oxide of ethyl, or spirits of wine, which is commonly produced by the fermentation of grain, starch, molasses, or sugar, but it must not be confused with wood alcohol, which is not made by fermenting at all, but by destructively distilling or heating wood in iron retorts or ovens and then condensing the vapours. The alcohol thus obtained is methyl alcohol, and is also known in commerce as wood alcohol, wood spirit, or wood naphtha.

I do not propose to deal with the latter substance, so will pass to the subject of this paper, and my remarks will be more readily appreciated when I say that over 240,000 proof gallons of spirits are manufactured annually in Natal, of which at least 100,000 gallons are exported from the Colony.

The only source of spirits in this Colony, as yet, is molasses, and I am not aware that any other process exists in Natal. But it must not be supposed that molasses is the only substance in Natal from which spirits can be produced at a low cost, although hitherto, owing to the large quantity of molasses derived from the various sugar mills, it has not been deemed expedient to resort to any other source. In other countries the raw materials usually employed in the manufacture of alcohol are corn, rye, barley, rice, potatoes, sweet potatoes, beet, and molasses, but the last source is the one most largely used.

I commend to my readers, however, the commercial possibilities of sweet potatoes (*Ipomoea batatas*), so well known in Natal, as a source of industrial alcohol. This well known tuber yields enormous crops, and in India, according to Watt ("Dictionary of the Economic Products of India"), has yielded crops of over 10,000 lbs. per acre. Sweet potatoes yield on an average about 25 per cent. of starch, and the theoretical yield of absolute alcohol from starch is 56.78 per cent. by weight. The theoretical yield of alcohol computed in this way is, however, never obtained in practice, owing to the losses due to evaporation and imperfect fermentation, but it should be possible to obtain in practice at least 80 per cent. of the theoretical yield.

Amongst other possible sources of industrial alcohol is the beet (*Beta vulgaris*), but time and space will not permit me to enter into a discussion of this and other possible commercial sources, so I will proceed to the subject indicated by the title of this paper.

Germany without a doubt occupies the premier position amongst the world's nations as regards alcohol engines, and has been a leading exponent in the development and uses of denatured or industrial alcohol for the past twenty years. In that country alcohol-engines are used in preference to steam power for all agricultural requirements, and the following extracts from a statement made by the manufacturers of the Deutz alcohol engine ("Denatured or Industrial Alcohol," by R. F. Herrick), will be, I think, of particular interest:—

"The great desire to secure a native fuel, such as alcohol, which could easily be produced from raw agricultural materials in Germany, as well as the importance of the need of also obtaining the highest perfected type of alcohol-using motors for portable uses in Germany, gave rise, in the year 1902, through the efforts of the German Agricultural Association, to a competitive exposition in Mannheim, open to all visiting motors, the features of the alcohol-using motor to be that it should be portable, and also able to be successfully used for technical and agricultural purposes as against the common kerosene and gasoline motors, which latter had in turn replaced and succeeded steam-power for such uses.

"Their low running cost and maintenance, and not the least their merit in the less danger from causing fires, has all tended to universally introduce these motors for industrial agricultural operations.

"The unbearable odour of kerosene, as well as its great tendency to sootiness, acts as a restraint in the extension of its universal use, while with gasoline the development of its use is retarded by having to import it from foreign countries, as the supply in the event of a foreign war would be cut off.

"The efforts of the motor manufacturers had long ago been directed to producing from agricultural sources a native combustible or fuel which could be economically used in motors, and this was successfully accomplished, as demonstrated by the tests made at Mannheim by Prof. E. Mayer. . . .

"At the present time, of all the Deutz locomotives now being used, more than one-third are run with alcohol. An extremely desirable feature in enabling these new alcohol motors to attempt to compete with steam locomotives is their much greater freedom from risks of causing fire by the sparks thrown out by the steam locomotive, as with alcohol this is effectually precluded. This feature renders them especially desirable for agricultural uses. The stationary Deutz alcohol-engines are also wholly preferred to steam, and there has been an uninterrupted installation of such alcohol engines since 1901. . . .

"In no other country has such progress been made in the employment of alcohol for industrial and technical uses as in Germany.

"The development of the industrial uses of alcohol merits most attention, therefore, in the case of Germany, as that country enjoys a leading position among other nations in this respect.

"This condition of affairs has been largely attained by the efforts of the great agricultural and industrial distilleries."

In America the use of alcohol-engines has been rewarded with marked success, and that country is slowly but surely gaining a reputation in that respect, although in the United States alcohol has found a formidable competitor in kerosene, owing to the very low price of the latter, but in Natal, where the cost of kerosene is far greater, I do not think the latter need be taken into account.

It may surprise the readers of this *Journal* to know that the price of industrial alcohol in Natal is quite as cheap as in Germany, the great seat of the industry, namely, one shilling per gallon; and, in view of the great loss of tractive power in this Colony during the past year, I do not see why alcohol engines should not be universally used in Natal for all purposes connected with the agricultural industry. The chief advantages of these engines over steam power are both the cheaper initial cost and the cheaper cost of running and maintenance.

With a view to ascertaining to what extent industrial alcohol could be used as a source of power for motor vehicles, I approached Mr. T. L. Hughes, of the Natal Chemical Syndicate, South Coast Junction, who very courteously supplied me with the following information:—

"With the object of investigating the possibilities of ordinary commercial methylated spirits as a source of motive power, experiments were made by Messrs. Etlinger Bros., engineers, of Durban, using spirit of about 61 o.p., which has been denatured in accordance with the Natal regulations, and in every respect identical in grade with the product which we have supplied for the past three years to the principal licensed dealers. The spirit is perfectly colourless and clear, and free from suspended matter, the latter an important consideration. Messrs. Etlinger Bros. soon discovered that certain small alterations, which they fully describe in their report, were necessary when alcohol was to be used in a motor designed for petrol.

"Spirit denatured in accordance with the requirements of the law in Natal and the other South African Colonies has for the past few years been sold by manufacturers to merchants at a considerably lower price than the landed cost of petrol, although the very low prices occasionally touched have no doubt been due to excessive competition amongst manufacturers. It is a well known fact that there is not a single distillery in Natal working up to maximum output; and in the event of locally produced alcohol ousting petrol from its present position, the largely increased

production must reduce costs, to the ultimate benefit of the consumer, and a complete and profitable outlet would be found for molasses and other materials which constitute the basis of this industry.

"The petrol companies have already begun to realise the immense strides made by alcohol, notably in Germany and America, and would probably attempt to thwart any development in this direction here by the usual methods and tactics adopted to starve out a new competitor. Under these circumstances it would be but natural to expect the South African Customs Union to extend some measure of 'protection' to foster an industry, every ounce of the raw material for which would be the product of South African soil, and every shilling spent on alcohol for the production of 'power' would be one which at present goes out of the country.

"To sum up, we may take it that, although manufacturers and technical men in Natal have devoted more than casual attention to this subject, much remains to be learned, and the principal person to whom we must look to in its development is the engineer, whose province it will be to show to South Africans how effectively denatured alcohol can substitute petrol."

The following is the report of Messrs. Etlinger Bros. referred to in the foregoing:—

"Petrol, which about ten years ago was regarded as a waste product, is now one of the most valuable components of crude mineral oil. The control, however, of the principal sources of the petrol supply being now in the hands of two companies, it is evident that they might adopt a policy that might lead to disastrous results to users of motor vehicles, and this, together with the fact that the important sources of supply of petrol will probably diminish in the near future, as instanced by the demand increasing at a rate much greater than the rate of increase of supply, has raised the question as to what alternative fuels are available.

"These may be classified under two headings, viz.:—1. Fuels limited in amount; 2. Fuels unlimited in amount; and public interest is naturally centred on the latter; and it is without doubt to fuel derived from vegetation that we must look, namely, alcohol, the supply of which, unlike the fuels under the first heading, is practically inexhaustible.

"There are three points, however, in which alcohol is popularly supposed to compare unfavourably with petrol. These are:—1. Corrosive effect; 2. Starting from cold; and 3. Vaporisation.

"*Corrosive effect.*—With regard to this, any corrosive effect that may occur is due to impurities in the denaturing agent present in commercial alcohol. This we understand can be eliminated. Even if it were not, the difficulty would be overcome if complete combustion were obtained.

"*Starting from cold.*—This is the most serious disadvantage, as it necessitates either (a) Mixing the alcohol with some other fuel which will vaporize without any external application of heat; (b) Using external

application of heat; (c) Using a carburetter suitably designed to overcome the difficulty. (This has not yet been found so far as we are aware.)

"*Vaporization.*—Alcohol requires 5 per cent. of its total heat of combustion to vaporize it. As, however, a large amount of heat produced passes off in the exhaust, this is available for vaporization and does not represent any thermal loss.

"At the request of some friends we have endeavoured in spare moments to get together some practical information regarding the use of alcohol.

"Although often seriously discussed in England, it is invariably for the purpose of reminding the 'Petrol Ring' that there is a competitor in the field, owing to the fact that alcohol cannot be purchased in England at a reasonable rate, and also owing to the fact that makers of motor vehicles are all too busy making their machinery for use with petrol to be able to experiment with alcohol.

"A considerable amount of work in this direction has, however, been done, and one authority writes as follows:—

"Alcohol evaporates less easily than petrol. It also explodes less violently, but maintains its mean explosion pressure rather better.

"In order to compete in price per volume, alcohol should be less than two-thirds of the price of petrol. Both alcohol and petrol, with the same volume of air, might produce about the same amount of heat (or power), viz., 3,400 calories per kilo of oxygen, and we might therefore expect that with the same cylinder capacity the power would be the same, but (1) on the level, a petrol motor driven by alcohol is slightly less speedy than when driven with petrol; (2) uphill, the motor is found to be slightly more powerful at the same speed."

"Personally we have only made a few preliminary experiments as yet with denatured alcohol 61 o.p., a single cylinder 3 h.p. motor cycle being used. Six of the extra air holes made in the 'Spray' carburetter for use with petrol were closed, leaving one air inlet from which a small copper tube was led, this tube being coiled at the end and inserted *inside* the exhaust silencer, the open end being brought just through the side of the silencer. The engine had been standing for about an hour after use with petrol, and started easily with alcohol, without any assistance from external heat. The bicycle was then ridden about six miles on hilly roads, and the rider reported equally good results with the alcohol as with petrol on the whole, but better results on low speeds. The sparking plug was removed after the trial. There were no signs of sooting, but the end of the plug had a yellow sulphurous coating.

"A second preliminary experiment was made with a view of ascertaining the quantity required per mile as compared with petrol, a different supply of alcohol being used in this case after reporting the yellow deposit on the plug. The particulars given are correct, though wanting in detail. The bicycle in this case started up without external heat after

standing for two hours (after use with petrol) with the same adjustments as in the previous trial. It then covered a distance of twelve miles nearly all uphill on $1\frac{1}{2}$ pints of alcohol, and back over the same distance (*down hill nearly all the way*) on $1\frac{1}{4}$ pints of petrol. The sparking plug after this run was perfectly clean.

"Being well satisfied with the above experiments, we intend making further trials on a more extensive scale as soon as time permits."

I think my readers will agree with me that the foregoing report clearly demonstrates the fact that it is perfectly feasible to use alcohol in place of petrol for motor vehicles if the one great disadvantage can be overcome, viz., initial combustion. I think this drawback would be reduced to a minimum, if not altogether overcome, if the alcohol is denatured with a small proportion of gasolene; and I trust that Messrs. Etlinger will soon be able to give account of their further trials, which will be awaited with interest by all users of motor vehicles. In any case, however, the disadvantage of initial combustion would not be a drawback when the alcohol is to be used for stationary engines, as in that case it is perfectly easy to apply external heat.

As regards the first disadvantage mentioned by Messrs. Etlinger—corrosive effect—this has always been the case where the alcohol has been denatured with pyridine bases; but as in Natal and the other South African Colonies it is not necessary to add pyridine as a denaturant to spirit for motor use, the denaturing agent in this case being petrol or benzine, the corrosive effect will not be noticed to any appreciable extent, except if the spirit is not sufficiently pure, but I have no doubt that the manufacturers will take care to guarantee the purity of their product.

A slight revision of the existing Excise regulations may be necessary should the use of alcohol engines and motors become an established and universal fact in South Africa, thus stimulating a trade which will benefit the whole of the South African Colonies, and Natal in particular. I lay particular stress on Mr. Hughes' remarks that *it is a well known fact that there is not a single distillery in Natal working up to maximum output*, and there can be no doubt that, if alcohol is universally used as a means of power, it will be necessary to resort to other sources of production, such as sweet potatoes, or beet.

In conclusion, I have to express my indebtedness to Mr. A. Pardy, F.C.S., Mr. J. Medley Wood, Messrs. Hughes, Etlinger Bros., and others who have so kindly supplied me with various details of information.

The following addresses may prove useful to those who desire further information on the subject:—

Deutz Gas Engine Works, Ltd., Cologne-Deutz, Germany.

Hart-Parr Gas Engine Co., Charles City, Iowa, U.S.A.

August Mietz Iron Foundry and Machine Works, 128, Mott Street, New York, U.S.A.

Messrs. Etlinger Bros., P.O. Box 178, Durban.

Possible Industries.

THE PRODUCTION OF STARCH.

By ALEX. PARDY, F.C.S., Analyst.

STARCH is of common occurrence in many of our fruits, cultivated roots and tubers, and in most grains it forms the chief constituent.

The principal commercial sources of the present day starches are the potato, mealie, rice, arrowroot, and wheat, from which it is obtained and manufactured into the article so largely used for domestic purposes, in laundries, in the arts and manufactures, and in the preparation of other products to which it gives rise.

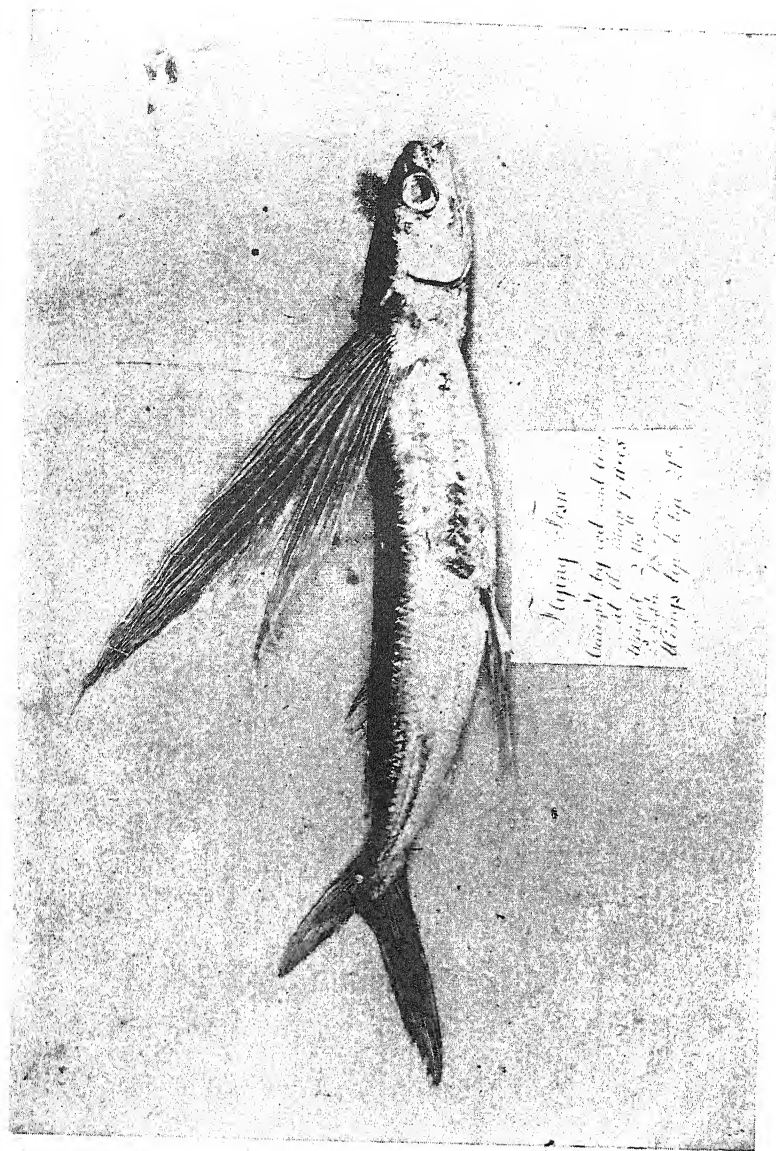
Maize is extensively grown in America for its starch. There it appears to form the chief source, and is the means of producing an enormous amount each year. The grain contains about 60 or 70 per cent. of starch, yielding, in a crop of 2,000 lbs. of grain, something like 1,200 or 1,400 lbs. of starch per acre.

The potato has long held a prominent place as a starch producer. It is cultivated extensively in Europe for this purpose, and ranks high in the world's supply. A crop of 5 tons containing about 18 per cent. would yield about 1,800 lbs. of starch per acre.

Another crop which has frequently been referred to as a source of this article is the sweet potato. It seems to vary considerably in its yield per acre, and 5 to 20 tons, even 40 tons, are mentioned as having been obtained. Taking the crop at 10 tons, which seems to be possible under moderate conditions, the return of starch—estimating it to contain 22 per cent.—would work out at 4,400 lbs. per acre.

There is still another prolific source which has engaged some attention, principally in America, viz., cassava, which is said to produce from 5 to 6 tons of tubers per acre. These contain from 23 to 25 per cent. of starch, and would consequently return from 2,400 to 2,800 lbs. of starch per acre.

There appears to be a large demand for starch, not only for domestic purposes but also in connection with the manufacture of textile fabrics and in brewing; and cassava starch has been spoken very favourably of in connection with the dressing of Manchester goods, in which direction it has been stated there is an assured market for a high quality starch at remunerative prices. It is quite possible that the demand might also be made to include that of the sweet potato.



FLYING FISH.

This flying fish was caught by Mr. J. J. Stephenson, of the Department of Agriculture, with a rod and line at the Bluff. It weighed two pounds, its length was 18 inches, and its wings, from tip to tip, were 21 inches across.

As a source of dextrin, otherwise known as moist or British gum, which is extensively used as a substitute for gum arabic and natural gums, starch is employed, and potato starch appears to be particularly suitable for the purpose. Dextrin is obtained from starch by the action of diastase, acid or heat, and is employed as an adhesive, in pharmacy and confections, in printing wall papers, for the stiffening and glazing of cards and paper, in calico printing, and in many other ways connected with the fine arts.

In the manufacture of alcohol the various forms of starch find a large outlet; and it is important in view of the possibilities of alcohol as a cheap and unlimited source of heat and power when other sources are becoming exhausted that consideration of an outlet for such easily produced crops as those above mentioned may easily lead to the establishment of a large and profitable industry.

Lucerne is a crop upon which the American farmer sets enormous value, remarks *Agricultural News*, and it flourishes in all parts of the country, being able to withstand both the heat of the Southern summer, and the very severe frosts of the Northern States in the winter. Each year sees an increasing acreage of the crop all through the Western States, and great quantities of it are now being converted into alfalfa meal, which, mixed with molasses, is a common cattle food.

A writer in an Indian paper relates a curious incident illustrating the intelligence of the buffalo, which is used for draught and plough purposes in the East. He was one night watching over a goat which he had tied up as bait for a leopard, when a herd of buffaloes from the village whence he had purchased the goat approached through the jungle. At first they seemed afraid of the goat, but, overcoming their fears, formed up in a solid phalanx, as these animals do in the face of an enemy, and ventured close up to the goat. After smelling at it for several minutes they seemed to recognise it as an old friend, and moved on; the goat strained at the rope in its endeavours to follow them. The buffaloes evidently expected the goat to accompany them, for they halted after going a few yards, and presently an old cow buffalo came back, smelt at the goat again, then, placing her left horn under the rope, gave a jerk; this broke the tether, and the goat, regaining its feet, at once joined the buffalo herd, and went away with its rescuers.

Natal's Progress in 1906.

AGRICULTURAL STATISTICS.

THE statistics for the year 1906 have been considerably delayed in compilation owing to the pressure of other work; and are now only just ready for publication. The statistics for the year 1907 are already being collected, and efforts will be made to have them ready for publication early in 1908.

In order to record the progress which Natal is making in the way of sub-division of farms, information was solicited from each farmer as to the acreage of his farm. Unfortunately, just after the forms had been sent out, the question of taxation of land was discussed; and many farmers seemed to entertain the suspicion that our enquiries were made with the ultimate view of helping to fix a land tax, so that the response to our request was not so well met as would otherwise have been the case. However, interesting information is disclosed by the acreages which were returned, and we can see clearly, for the first time, the relative sizes of the various holdings in Natal. These are shown to be :—

				Natal.	Zululand.	Total.
1	—	50 acres	..	94	2	96
51	—	100	..	68	6	74
101	—	200	..	104	2	106
201	—	500	..	283	13	296
501	—	1,000	..	431	12	443
1 001	—	2 000	..	760	13	773
2,001	—	3 000	..	385	7	392
3,001	—	4 000	..	199	2	201
Above 4,000		..	...	218	2	220
				2,542	59	2,601

Returns were thus received in respect of only 2,601 farms, and the unwillingness of farmers to send in information of this nature may be gauged from the fact that there are approximately 4,000 farms in the Colony.

AVERAGE YIELD PER ACRE.

The average yield per acre in 1906 of the principal crops is shown to be :—

Barley (grain)	...	...	...	5·8 muids
„ (forage)	...	...	...	2·8 tons
Beans	...	...	...	3·6 muids
Buckwheat	...	...	...	4·3 „
Hay	...	...	...	1·8 tons
Kafir Corn	...	...	...	4·9 muids
Mangolds	...	...	...	9·4 tons
Mealies	...	...	...	5·4 muids
Millet (grain)	...	...	...	5·1 „
„ (forage)	...	...	...	2·3 tons
Oats (grain)	...	...	...	7·1 muids
„ (forage)	...	...	...	1·6 tons
Onions	...	...	...	50·4 muids
Peas	...	...	...	4·3 „
Potatoes	...	...	...	28·2 „
Pumpkins	...	...	...	2·7 tons
Sugar	...	...	...	1·7 „
Sunflower	...	...	...	5·0 muids
Sweet Potatoes	...	...	...	31·0 „
Tea	...	...	...	661·0 lbs.
Tobacco	...	...	...	837·0 „
Turnips	...	...	...	7·5 tons
Wattle Bark	...	...	...	4·7 „
Wheat	...	...	...	5·9 muids

A THREE-YEAR COMPARISON.

The financial depression affecting the whole of South Africa was just as acute during 1906 as it was during 1905, and, in fact, even now shows no present sign of lifting.

In order to show what progress we have made of late in production a three-year comparison is given.

COAL.

The exports of Coal from the Colony during the three years were as follows :—

	1904.	1905.	1906.
	Tons.	Tons.	Tons.
By Sea—			
Bunker	383,587	561,250	487,892
Cargo	12,431	42,618	215,977
Overland	99,514	172,827	146,140
	<u>495,532</u>	<u>776,695</u>	<u>850,009</u>

COTTON.

This is still being tried in several localities and small shipments have been sent home with encouraging results. A very healthy lot of cotton was grown by a syndicate on the Winterton Irrigation Settlement, but, unfortunately, just before the bolls ripened the whole of the crop was destroyed by a hailstorm. The time of planting has still to be determined in the various coast districts. Owing to the incidence of the past season, which was exceptionally wet, some crops were rendered valueless which otherwise would have probably matured, whilst, *vice versa*, crops matured which at other times would have been inferior, owing to having been planted at what some consider the wrong time.

FIBRE.

Considerable headway is being made with fibre plantations, companies are being formed, and there is every prospect in the near future of fibre being of considerable value as an export. *Furcraea gigantea* (fourcroya) is the plant which is principally being cultivated, and is the most likely to form the basis of the industry. Attempts are being made to obtain sisal plants, but with poor success. Ramie is being tried on a small scale; and experiments are also being conducted with some of our native species: the wild banana, *gomphocarpus*, etc.

RUBBER.

Leases have been entered into by the Government with three different parties for the purpose of developing the rubber lying dormant in Zululand. Unfortunately, the Native Rebellion and then the spread of East Coast Fever and the consequent prohibition of all movement of cattle, combined with an extra deadly malarial and horsesickness season, have militated against rapid progress, so that not much work has been done so far.

OUR MEAT SUPPLIES.

It will be seen that the imports of meat during 1906 show a substantial falling off as compared with the two preceding years. Although this means a loss to the Colony in one way—in the customs, railway and port dues—yet it is a healthy sign, as it implies that the Colony was itself able to supply a larger proportion of the fresh meat consumed.

In 1906 we imported for slaughter 2,030 sheep and 1,398 oxen, as against 5,379 sheep and 1,992 oxen during 1905.

Our local butchers slaughtered 13,090 cattle, 38,430 sheep, and

6,090 pigs during 1906; and our farmers sold during the same period 142,919 lbs. of meat and 125,417 lbs. of pork.

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
<i>Imports :—</i>						
Beef and Veal	...	...	...	44,386,966	48,302,648	28,233,101
Mutton and Lamb	...	...	...	28,372,943	15,309,625	15,469,501
Pork	...	...	...	3,852,740	1,615,961	994,599
				<hr/>	<hr/>	<hr/>
				76,612,649	65,228,234	44,697,201
				<hr/>	<hr/>	<hr/>
<i>Exports (not S.A.P.) :—</i>						
<i>By Sea—</i>						
Beef and Veal	...	...	...	151,343	*	541,624
Mutton and Lamb	...	...	...	72,218	930,804	183,152
Pork	...	...	...	10,721	13,482	55,895
<i>Cape Colony—</i>						
Beef and Veal	...	...	...	1,218,092	1422,669	157
Mutton and Lamb	...	...	...	129,356	4,553	90
Pork	...	...	...	97,733	13,622	1,108
<i>O.R.C.—</i>						
Beef and Veal	...	...	...	989,684	363,381	71,493
Mutton and Lamb	...	...	...		103,859	30,294
Pork	...	...	...		744	1,505
<i>Transvaal—</i>						
Beef and Veal	...	...	...	35,833,266	23,896,288	110,523
Mutton	...	...	...	17,017,760	8,112,147	71,630
Pork	...	...	...	1,633,229	853,483	63,146
				<hr/>	<hr/>	<hr/>
				57,153,402	34,715,032	1,130,617
				<hr/>	<hr/>	<hr/>
<i>Exports (S.A.P.) :—</i>						
<i>By Sea—</i>						
Beef and Veal	...	...	...	10,388	..	...
Mutton	...	...	...		...	...
Pork	...	...	...		3,012	...
<i>Cape Colony—</i>						
Pork	...	...	...	...	1,578	16,527
<i>O R C.—</i>						
Beef and Veal	...	...	...	...	225	158
Mutton	...	...	...	...	...	442
Pork	...	...	...	...	...	609
<i>Transvaal</i>						
Beef and Veal	...	...	...	88,353	26,671	152,188
Mutton	...	...	...		3,224	22,015
Pork	...	...	...		2,754	30,895
				<hr/>	<hr/>	<hr/>
				98,741	37,464	222,834
				<hr/>	<hr/>	<hr/>

* Included under "Cape Colony."

† Includes Exports over-sea.

STOCK IN POSSESSION OF EUROPEANS.

The following is a statement of the numbers of cattle and sheep in possession of Europeans on the 1st August, 1906 :—

Cattle.—

Bulls, Imported	...	...	...	127
„ Colonial	...	...	...	3,922
Cows	...	...	...	84,093
Oxen	...	...	...	66,630
Other Cattle	..	...	...	89,085
				<hr/> 243,857

Sheep.—

Rams, Imported	...	..	...	327
„ Colonial	...	...	...	7,990
Sheep, Woolled	...	...	...	524,712
Kafir Sheep	..	...	...	50,126
Persian Sheep	...	..	...	16,900
				<hr/> 600,055

THE DAIRY INDUSTRY.

The Native Rebellion and the spread of East Coast Fever have placed a temporary check upon the development of the dairy industry, which, notwithstanding, is showing signs of progress, and bids fair to become one of the—if not *the*—most important branch of agriculture in Natal.

BUTTER.

		1904. lts.	1905. lbs.	1906. lbs.
Produced in Natal	...	736,589	709,580	793,026
<i>Imports :—</i>		<hr/> 5,480,624	<hr/> 5,795,582	<hr/> 5,545,014
<i>Exports (not S.A.P.) :—</i>				
By Sea...	...	28,789	30,758	22,504
Cape Colony	...	477,467	173,446	51,932
Orange River Colony	...	166,311	51,847	58,343
Transvaal	...	3,770,639	2,994,442	1,136,014
Southern Rhodesia	...	90	24	...
Basutoland	..	1,280	1,116	...
		<hr/> 4,444,576	<hr/> 3,257,633	<hr/> 1,268,793
<i>Exports (S.A.P.) :—</i>				
Cape Colony	...	...	92	70
O.R.C.	...	873	4,832	841
Transvaal	...	28,459	66,367	49,365
Basutoland	..	...	...	49
		<hr/> 29,332	<hr/> 71,291	<hr/> 50,325

CHEESE.

		1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal ...	...	8,542	45,522	37,860
<i>Imports :—</i>		2,183,844	1,841,133	1,922,103
<i>Exports (not S.A.P.) :—</i>				
By Sea...	...	15,892	4,039	4,549
Cape Colony ...	...	22,666	13,093	10,187
O.R.C. ...	...	93,843	64,028	91,784
Transvaal ...	..	1,349,585	842,522	794,274
Southern Rhodesia ...	...	1,025	590	236
Basutoland ...	...	10	...	...
		1,483,021	924,272	901,030
<i>Exports (S.A.P.) :—</i>				
By Sea ...	...	...	..	107
Cape Colony ...	...	...	543	3,052
O.R.C. ...	...	...	24	2,658
Transvaal ...	...	3,536	756	12,006
		3,536	1,323	17,823

CONDENSED MILK.

		1904. lbs.	1905. lbs.	1906. lbs.
<i>Total Imports</i> ...	...	8,957,806	6,919,084	6,747,906
<i>Exports :—</i>				
By Sea...	...	119,872	25,795	133,036
Cape Colony ...	...	44,199	62,157	41,047
O.R.C. ...	...	146,520	140,498	210,637
Transvaal ...	...	4,110,516	2,994,197	1,973,362
Southern Rhodesia ...	...	...	360	720
Basutoland ...	...	...	495	744
		4,421,107	3,223,502	2,359,546

EGGS

		1904. No	1905. No.	1906. No.
Sold by Europeans in Natal ...	...	4,700,088	5,055,828	5,621,436
<i>Total Imports</i> ..	...	1,955,830	2,269,931	1,594,929

EGGS—(continued).

<i>Exports (not S.A.P.) :—</i>			1904. No.	1905. No.	1906. No.
Cape Colony	..	...	6,516	..	...
O.R.C.	...	...	...	...	43,860
Transvaal	...	...	338,544	340,020	327,816
			<u>345,060</u>	<u>340,020</u>	<u>371,676</u>
<i>Exports (S.A.P.) :—</i>					
By Sea...	...	...	1,800	6,216	10,528
Cape Colony	...	...	...	144	552
O.R.C.	...	..	72,636	27,287	33,828
Transvaal	...	...	910,116	524,495	924,912
			<u>984,552</u>	<u>558,142</u>	<u>969,820</u>

BACON AND HAMS.

			1904. No.	1905. No.	1906. No.
Pigs owned by Europeans	...	...	18,177	24,900	23,377
			<u>lbs.</u>	<u>lbs.</u>	<u>lbs.</u>
Produced in Natal	...	..	317,600	893,398	895,839
Total Imports	...	...	2,088,353	2,107,178*	2,438,527
<i>Exports (not S.A.P.) :—</i>					
By Sea...	...	...	3,734	3,319	12,794
Cape Colony	...	...	6,380	12,299	8,004
O.R.C.	...	...	...	21,553	47,173
Transvaal	...	...	1,386,455	928,341	497,215
			<u>1,396,569</u>	<u>965,512</u>	<u>565,186</u>
<i>Exports (S.A.P.) :—</i>					
By Sea...	...	..	...	...	417
Cape Colony	...	...	14,503	3,920†	12,262
O.R.C.	...	...	...	8,063†	22,764
Transvaal	...	..	300,536	124,459†	192,824
Southern Rhodesia	...	...	...	..	467
Basutoland	...	...	...	...	50
			<u>315,039</u>	<u>136,442</u>	<u>228,784</u>

* Customs returns for second half of year include "Other cured meats," as well as Hams and Bacon.

† For six months only : 1st July to 31st December.

LARD.

	1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal ...	38,395	38,154	47,496
<i>Total Imports</i> ...	837,255	698,400	639,963
<i>Exports (not S.A.P.) :—</i>			
By Sea... ..	1,513	35,124	5,491
Cape Colony ...	6,960	...	8,360*
O.R.C.... ..	...	...	16,591*
Transvaal ...	512,555	442,060	353,516*
Basutoland ...	...	...	100*
	521,028	477,184	384,058

POULTRY.

	1904. No.	1905. No.	1906. No.
Fowls, Ducks and Geese owned by Europeans in Natal ...	250,911	323,401	244,730
	lbs.	lbs.	lbs.
Imports of Frozen Poultry ...	1,450,832	1,124,557	1,442,914

GENERAL FARMING.

ARROWROOT.

	1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal ...	53,984	36,960	28,336
<i>Exports (S.A.P. :—</i>			
By Sea... ..	62,021	106,418	8,500

BARLEY.

	1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal ...	380,600	424,400	300,600
<i>Total Imports</i> ...	385,322	673,092	139,986
<i>Exports (not S.A.P.) :—</i>			
By Sea... ..	2,154	194	10,133
Cape Colony ...	112	18,399	31,390
O.R.C.... ..	...	7,953	10,512
Transvaal ...	...	85,369	18,615
	2,266	119,915	70,650

* Partly South African Produce.

BARLEY—(continued).

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
<i>Exports (S.A.P.) :—</i>						
By Sea...
Cape Colony	51,499
O.R.C....	13,296
Transvaal	207	445
Southern Rhodesia	1,000
				...	207	20,240

BEANS AND PEAS.

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
Produced in Natal	...	...	...	1,008,800	1,181,500	1,213,400
<i>Total Imports</i>	...	...	...	1,167,581	603,126	422,111
<i>Exports (not S.A.P.) :—</i>						
By Sea...	...	...	...	6,433	8,618	6,871
Cape Colony	..	...	...	10,563	53,978	14,094
O.R.C....	...	...	...	...	12,622	6,133
Transvaal	...	..	...	...	282,198	206,821
Southern Rhodesia	...	...	...	...	500	...
Basutoland	...	...	...	...	3,758	...
				16,996	361,734	233,919
<i>Exports (S.A.P.) :—</i>						
Cape Colony	...	...	...	...	375,860	300,090
O.R.C....	...	...	...	...	20	2,734
Transvaal	...	...	...	...	9,845	351,199
Southern Rhodesia	...	...	...	...	...	...
Basutoland	..	...	...	...	...	200
				...	385,725	654,223

FODDER AND FORAGE.

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
Produced in Natal	...	...	...	50,637,440	66,691,440	53,240,320
<i>Total Imports :—</i>						
By Sea...	...	...	...	39,685,627	20,922,295	18,379,159
Overland	...	...	...	43,955	311,647	689,074
				39,729,582	21,233,942	19,068,233

FODDER AND FORAGE—(continued).

<i>Exports (not S.A.P.) :—</i>				1904. lbs.	1905. lbs.	1906. lbs.
By Sea...	...	...	...	117,236	1,782,336	120,320†
Cape Colony	...	...	...	485,720	1,217,319	58,821*
O.R.C. ...	...	...	...	...	237,888	103,680*
Transvaal	...	...	...	...	6,413,715	1,612,514*
Southern Rhodesia	...	...	...	...	36,455	3,028*
				602,956	9,687,713	1,898,363
<i>Exports (S.A.P.) :—</i>						
By Sea...	...	...	...	73,940	536,148	521,672†
Cape Colony	...	...	...	237,976	432,344	464,529*
O.R.C. ...	...	...	...	...	451,963	1,221,776*
Transvaal	...	...	...	...	5,665,727	5,998,905*
Southern Rhodesia	...	...	...	..	200	4,100*
				311,916	7,086,382	8,210,982

FRUIT.

<i>Fruit Sold in Natal :—</i>				1904. £	1905. £	1906. £
By Europeans	...	...	...	(?)	36,110	20,821
By Indians	...	...	...	(?)	12,380	16,856
Fruit Canned and Preserved...	...	...	...	1,214	3,557	2,705
				...	52,047	40,382
<i>Imports :—</i>						
By Sea...	...	...	...	59,781	64,492	22,917
Cape Colony	...	...	...	12		3,360
O.R.C. ...	...	...	...	14		106
Transvaal	...	...	...	1,084		1,141
				60,891	64,492	27,524
<i>Exports (not S.A.P.) :—</i>						
By Sea ...	...	...	...	...	649	222
Cape Colony	...	...	...	...	750	408
O R.C. ...	...	...	...	...	1,862	687
Transvaal	...	...	...	...	26,441	6,710
Southern Rhodesia	...	...	...	...	24	...
Basutoland	...	...	...	...	6	1
				...	29,732	8,028

* Consists of Hay, Lucerne and "Fodder and Forage not otherwise described."

† Does not include 93,408 lbs. of Oil-cake exported to Germany.

FRUIT—(continued)

	1904.	1905.	1906.
<i>Exports (S.A.P.) :—</i>	£	£	£
By Sea	144	92	143
Cape Colony	22,689	20,992	35,276
O.R.C.	6,069	6,382	9,442
Transvaal	54,938	67,287	78,494
Southern Rhodesia ... ..	...	11	3
Basutoland ... ..	...	...	21
	<u>83,840</u>	<u>94,764</u>	<u>113,379</u>

JAMS AND JELLIES.

	1904.	1905.	1906.
	lbs.	lbs.	lbs.
Produced in Natal ... ..	...	...	8,545
<i>Imports</i>	<u>1,728,731</u>	<u>1,380,658</u>	<u>1,588,358</u>

Exports (not S.A.P.) :—

By Sea	12,591	13,527	60,233
Cape Colony	8,500	7,035	294,808
O.R.C.	26,626	36,989	52,023
Transvaal	1,346,854	806,922	588,885
Southern Rhodesia	315	1,890	2,538
	<u>1,394,886</u>	<u>866,363</u>	<u>998,487</u>

Exports (S.A.P.) :—

By Sea	9,844	11,444	12,192
Cape Colony	72,067	69,277	108,875
O.R.C.	28,027	32,007	70,782
Transvaal	235,311	358,362	505,754
Southern Rhodesia	6,498	828	1,756
	<u>351,747</u>	<u>471,918</u>	<u>699,359</u>

KAFIR CORN.

	1904.	1905.	1906.
	lbs.	lbs.	lbs.
Produced in Natal by Euro-peans	4,608,600	6,327,200	5,428,400
<i>Total Imports</i>	<u>3,061,730</u>	<u>301,456</u>	<u>732,385</u>

KAFIR CORN—(continued)

<i>Exports (not S.A.P.) :—</i>				1904. lbs.	1905. lbs.	1906. lbs.
By Sea...		308,306	...
Cape Colony	†	1,038,174*	...
O.R.C.	†	3,885*	...
Transvaal	†	807,893*	...
					2,158,258	...
<i>Exports (S.A.P.) :—</i>						
By Sea...	2,000
Cape Colony	44,834
O.R.C.	27,217
Transvaal	1,440,113
Basutoland	10,000
				1,524,164

MAIZE, MAIZE MEAL AND SAMP.

				1904. lbs.	1905. lbs.	1906. lbs.
Maize produced in Natal	...	...	...	155,301,600	140,098,000	113,608,200
<i>Imports :—</i>						
By Sea...	...	..	...	43,638,365	524,627	1,299,853
Overland	...	...	...	190,000	884,626	2,530,510
				43,828,365	1,409,253	3,830,363
<i>Exports (not S.A.P.) :—</i>						
By Sea...	...	...	...	180,334	19,775	...
Cape Colony	...	...	...	8,736,101	133,592	...
O.R.C. ...	...	...	...	4,881,551	80	48
Transvaal	...	...	...	16,270,817	1,042,696	20
Southern Rhodesia	...	...	...	...	6,985	...
Basutoland	...	...	...	152,120	...	...
				30,221,123	1,203,128	68
<i>Exports (S.A.P.) :—</i>						
By Sea...	...	...	...	899,208	4,628,088	1,390,216
Cape Colony	...	...	...	17,071,092	79,638,771	39,404,961
O.R.C. ..	...	...	...	599,679	314,023	450,477
Transvaal	...	...	...	30,143,272	44,668,807	31,874,661
Southern Rhodesia	...	...	...	1,000	13,200	508,600
				48,714,251	129,262,889	73,628,915

* The figures for the first six months of the year were not shown separately in Customs returns

† Not shown separately in Customs returns.

MOHAIR.

	1904. No.	1905. No.	1906. No.
Angora Goats in possession of Europeans	75,708	83,369	79,096
	lbs.	lbs.	lbs.
Mohair produced in Natal ...	112,985	145,892	208,974
<i>Imports :—</i>			
Cape Colony (E.G.) ...	8,420	22,188	15,064
O.R.C.	120,553	359,074	445,766
Transvaal	67,044	90,140	94,003
Basutoland ... ..	...	5,386	25,269
	196,017	476,788	580,102
<i>Exports (S.A.P.) :—</i>			
By Sea	708,464	1,029,219	1,075,030

OATS.

	1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal	2,507,580	547,200	398,340
<i>Imports</i>	153†	6,108,007	10,614,189
<i>Exports (not S.A.P.) :—</i>			
By Sea ... ..	...	43,147	27,686
Cape Colony .. ..	...	185,897	66,593
O.R.C. ... ..	...	1,039,997	178,063
Transvaal ... ..	...	4,195,114	1,411,116
Southern Rhodesia ...	...	9,588	...
	..	5,473,743	1,683,458
<i>Exports (S.A.P.) :—</i>			
By Sea ... ..	...	...	...
Cape Colony .. ..	...	2,400*	1,421
O.R.C. ... ..	...	5,577*	26,047
Transvaal ... ..	...	6,798*	59,316
Southern Rhodesia ...	..	...	3,900
	...	14,775	90,684

* The figures for the first six months of the year were not shown separately in Customs returns

† By Sea only. Imports from other parts of the Customs Union not shown.

ONIONS.

		1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal	... ..	552,187	220,050	863,400
<i>Imports</i>	... ..	2,164,379	2,441,571	1,674,631
<i>Exports (not S.A.P.) :—</i>				
By Sea...	... ..	160	300†	26,026
Cape Colony	... ..	22,352	1,316†	13,072
O.R.C....	... ..	...	2,799†	29,397
Transvaal	... ..	237,972	14,826†	34,312
Basutoland	... ..	...	...	218
		260,484	19,241	103,025
<i>Exports (S.A.P.) :—</i>				
By Sea ..	... ..	200	1,555†	5,585
Cape Colony	... ..	...	1,158†	5,456
O R C ...	... ..	..	11,314†	36,104
Transvaal	... ..	283,324	14,791†	192,096
		283,524	28,818	239,241

PLANTS, BULBS AND TREES.

		1904. £	1905. £	1906; £
<i>Exports (S.A.P.) :—</i>				
By Sea...	... ..	812	344†	622
Cape Colony	... ..	...	219†	213
O.R.C ...	... ..	...	3,331†	620
Transvaal	... ..	...	337†	5,392
Southern Rhodesia	... ..	...	...	2
		812	4,231	6,849

POTATOES.

		1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal	... ..	21,882,450	20,997,300	20,659,500
<i>Imports</i>	... ..	10,240,675	6,220,120	7,996,162

† For first six months of year only—not shown separately after that date in Customs returns.

† For six months only. The figures for the first six months of the year were not shown separately in the Customs returns.

POTATOES—(continued).

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
<i>Exports (not S.A.P.) :—</i>						
By Sea...	...	...		13,075	42,756*	23,989
Cape Colony	...	...		14,495	12,045*	42,968
O.R.C. ...	...	...		203,840	31,330*	285,470
Transvaal	...	...		629,440	528,697*	2,504,758
Southern Rhodesia	...	...		...	14,300*	...
				<u>860,850</u>	<u>629,128</u>	<u>2,857,185</u>
<i>Exports (S.A.P.) :—</i>						
By Sea...	...	...		5,072	25,780*	35,752
Cape Colony	...	...		2,625	279,930*	298,477
O.R.C....	...	...		51,520	4,480*	198,881
Transvaal	...	...		2,886,640	2,157,120*	9,728,497
				<u>2,939,857</u>	<u>2,467,310</u>	<u>10,261,607</u>

RICE.

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
<i>Imports</i>	...	...	...	46,214,112	61,853,062	48,103,408
<i>Exports :—</i>						
By Sea ...	...	...		36,008	...	97,196
Cape Colony	...	...	}	12,203,437	206,208	167,522
O.R.C. ...	...	...			384,150	489,607
Transvaal	...	...			20,372,613	13,030,491
Southern Rhodesia	...	...			2,912	10,528
Basutoland	...	...			9,050	6,036
Bechuanaland	...	...		...	...	224
				<u>12,239,445</u>	<u>20,974,933</u>	<u>13,801,604</u>

SUGAR.

The whole of the Coast Lands of Zululand suitable for sugar planting, between the Tugela and the Umhlathuzi, have been taken up on the 99-year-lease system, and are being planted with cane. The erection of a central mill at the Amatikulu is in hand, and within the next year or two the cane will be maturing, thus considerably adding to the Colony's output.

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
<i>Produced in Natal :—</i>						
Sugar ...	...	...		43,093,568	59,591,504	46,994,000
Molasses	...	...		5,356,495	2,823,650	2,701,240
				<u>48,450,063</u>	<u>62,415,154</u>	<u>49,695,240</u>

* For first six months of year only—not shown separately after that date in Customs returns.

SUGAR—(continued)

				1904.	1905.	1906.
				lbs.	lbs.	lbs.
<i>Imports :</i>						
Refined...	...	...	...	3,434,203	3,982,377	12,234,556
Unrefined	...	...	...	14,043,723	17,580,033	
Molasses, etc.	...	...	...	10,463	294,273	
Golden Syrup	...	...	...	1,157,111	1,616,914	1,243,039
				<hr/>	<hr/>	<hr/>
				18,645,500	23,473,597	13,490,019
				<hr/>	<hr/>	<hr/>
<i>Exports (not S.A.P.) :—</i>						
By Sea—						
Refined	...	...	...	52,849	66,487	67,571
Unrefined	...	...	...	176,195	69,069	
Sugar Products	...	...	...	1,232	1,328	
Cape Colony—						
Refined	...	...	...	13,354	184,451	525,897
Unrefined	...	...	...	301,972	1,225,518	
Sugar Products	...	...	...	3,468	22,836	
O.R.C.—						
Refined	...	...	...	39,885	189,970	471,699
Unrefined	...	...	...	17,443	885,883	
Sugar Products	...	...	...	...	36,237	
Transvaal—						
Refined	...	...	...	907,628	1,738,434	1,558,887
Unrefined	...	...	...	2,738,612	3,343,698	
Sugar Products	...	...	...	928,409	1,008,271	
Southern Rhodesia—						
Refined	...	...	...	...	...	672
Unrefined	...	...	...	...	1,140	
Sugar Products	...	...	...	...	560	
Basutoland—						
Refined	...	...	...	...	...	6,156
Unrefined	...	...	...	...	735,009	
Sugar Products	...	...	...	...	112	
				<hr/>	<hr/>	<hr/>
				5,181,037	9,809,063	3,521,193
				<hr/>	<hr/>	<hr/>
<i>Exports (S.A.P.) :—</i>						
By Sea—						
Refined	...	...	...	140	2,000	65,175
Unrefined	...	...	...	20,087	7,332	
Sugar Products	...	...	...	43,247	72,242	
Cape Colony—						
Refined	...	...	...	15,762	32,249	11,869,495
Unrefined	...	...	...	10,479,894*	10,536,528	
Sugar Products	...	...	...	100,452	66,063	

* Includes small quantities of Refined Sugar exported to East Griqualand and Pondoland.

SUGAR—(continued).

		1904. lbs.	1905. lbs.	1906. lbs.
O.R.C.—				
Refined ...	...	4,262,535	81,624 3,137,537	6,468,808
Unrefined ...	...		
Sugar Products	...	20,867	22,048	...
Transvaal—				
Refined ...	...	46,485	272,837	31,430,954
Unrefined ...	...	30,322,490	21,108,484	
Sugar Products	...	430,919	264,290	
Southern Rhodesia—				
Refined ...	...	1,701	...	19,213
Unrefined ...	...		
Sugar Products	...	..	112	...
Basutoland—				
Refined ...	...	16,758	...	71,343
Unrefined ...	...		
Sugar Products	...	...	3,324	...
Bechuanaland—				
Refined ...	...	...	1,450	143,533
Unrefined ...	...	...	9,418	
		<u>45,761,407</u>	<u>35,652,603</u>	<u>50,075,751</u>

TEA.

		1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal ...	...	<u>2,406,367</u>	<u>1,633,178</u>	<u>1,508,455</u>
Imports ...	...	<u>1,018,470</u>	<u>1,444,592</u>	<u>1,465,333</u>
Exports (not S.A.P.) :—				
By Sea...	...	12,806	20,869	7,126
Cape Colony ...	...	24,323	27,005	21,905
O.R.C. ...	...	39,885	51,314	68,720
Transvaal ...	...	773,095	910,765	482,937
Southern Rhodesia	...	220	...	824
Basutoland ...	...	...	78	12
		<u>850,329</u>	<u>1,010,031</u>	<u>581,524</u>
Exports (S.A.P.) :—				
By Sea...	...	1,524	1,443	2,057
Cape Colony ...	...	302,133*	297,266	295,620
O.R.C. ...	...	50,405	45,014	47,887
Transvaal ...	...	214,425	210,812	238,035
Southern Rhodesia	...	...	125	661
Basutoland ...	...	...	...	540
Bechuanaland ...	...	...	1,364	1,468
		<u>568,487</u>	<u>556,024</u>	<u>586,268</u>

* Includes small quantity exported to Basutoland.

TOBACCO.

	1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal by Europeans	213,525	289,590	217,970
<i>Exports (S.A.P.) :—</i>			
By Sea—			
Unmanufactured ...	20,438	1,710†	4,993
Cigars	246		118
Cigarettes ... ..	...		37
Manufactured—N.O.D.	1,444		680
	22,128	1,710	5,828
Cape Colony—			
Unmanufactured ...	49,295*	703,612†	347,739
Cigars	4,931		151,360
Cigarettes	180,183		2,209
Manufactured—N.O.D.	39		68,634
	234,448	703,612	433,942
O.R.C.—			
Unmanufactured ...	29,458	43,918†	28,826
Cigars ... ..	...		3,990
Cigarettes ... ..	...		3,704
Manufactured—N.O.D.	...		24,323
	29,458	43,918	60,843
Transvaal—			
Unmanufactured ...	843,325†	1,244,573†	922,557
Cigars			50,734
Cigarettes			5,912
Manufactured—N.O.D.			145,543
	843,325	1,244,573	1,124,746
Southern Rhodesia—			
Unmanufactured ...	...	...	2,092
Basutoland—			
Unmanufactured ...	...	...	100
Cigars ... ..	...	...	3
Manufactured—N.O.D.	...	...	133
	...	...	236
Grand Total of Exports (S.A.P.)	1,129,359	1,993,813	1,627,687

* To East Griqualand : not described, but probably unmanufactured.

† Details not given.

VEGETABLES, FRESH.

(Other than Potatoes and Onions.)

	1904. £	1905. £	1906. £
Produced in Natal :—			
By Europeans	4,848	4,606	3,542
By Indians	8,090	7,262	5,816
	<hr/> 12,938	<hr/> 11,868	<hr/> 9,358
Exports (S.A.P.) :—			
By Sea	166	51	65
Cape Colony	38	326	635
O.R.C.	2,349	1,915	2,876
Transvaal	11,198	26,324	11,298
Basutoland ... ..	...	1	1
	<hr/> 13,751	<hr/> 28,617	<hr/> 14,875

WATTLE BARK.

The returns from our farmers of their output of wattle bark is always considerably below the actual export, as will be seen by a comparison of the three years. As the whole of the wattle bark exported comes from Natal itself, it is evident that wattle growers under- rather than over-estimated their output.

	1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal	24,852,800	30,508,800	24,022,960
Imports :—			
Cape Colony (E.G.)	264,320	600,320	57,576
Transvaal ... ..	...	60,480	...
	<hr/> 264,320	<hr/> 660,802	<hr/> 57,576
Exports :—			
By Sea... ..	35,434,560	39,231,360	33,054,539
Cape Colony ... ..	...	...	135,471
O.R.C. ... ..	...	...	4,558
Transvaal ... ..	...	...	2,340
	<hr/> 35,434,560	<hr/> 39,231,360	<hr/> 33,196,908

WHEAT AND FLOUR.

	1904. lbs.	1905. lbs.	1906. lbs.
Wheat produced in Natal ...	484,000	249,400	511,800

Exports (S.A.P.) :—

Wheat—

Cape Colony ...	...	622*	180
O.R.C. ...	...	1,360*	3,646
Transvaal ...	...	2,516*	2,686
	...	4,498	6,512

Flour—

By Sea ..	...	...	5,122
Cape Colony ...	...	200*	520
O.R.C. ...	...	280*	2,922
Transvaal ...	...	8,098*	21,352
	...	8,578	29,916

Flour, etc, ground from Imported Grain—

Cape Colony ...	...	...	26,491
O.R.C. ...	...	...	556,708
Transvaal ...	...	...	1,049,236
Southern Rhodesia ...	...	...	8,200
	...	...	1,640,635

WOOD.

	1904. £	1905. £	1906. £
<i>Exports (S.A.P.) :—</i>			
By Sea... ..	508	355	2,876
Cape Colony	31	1,040	2,674
O.R.C. ... ..	...	1,427	7,317
Transvaal ... ..	...	13,763	25,919
Southern Rhodesia ... ..	...	...	276
Basutoland ... ..	...	...	36
	539	16,585	39,098

* For six months only. The figures for the first six months of the year were not shown separately in the Customs returns.

WOOL.

		1904. lbs.	1905. lbs.	1906. lbs.
Produced in Natal ...	...	1,367,856	1,793,630	1,884,615
<i>Imports :—</i>				
Cape Colony ...	...	4,203,291	4,365,162	1,015,789
O.R.C....	...	558,677	2,273,405	6,664,385
Transvaal ...	...	2,079,938	2,242,736	5,171,705
Basutoland ...	...	...	200,511	280,383
		6,841,906	9,081,814	13,132,262
<i>Exports :—</i>				
By Sea...	...	10,319,754	13,712,542	17,870,336
Transvaal ...	...	...	...	368
		10,319,754	13,712,542	17,870,704

EMBRYONIC INDUSTRIES.

<i>Exports (S.A.P.) :—</i>	1904. £	1905. £	1906 £
Ale, Beer, Stout and Cider—			
By Sea ...	45,222	39,973	331
Overland, S.A.* ...			36,886
Biscuits, Bread and Cakes—			
By Sea ...	...	6,990	11
Overland* ...			9,876
Carriages, Carts, etc.—			
By Sea ...	38,301	30,221	2,060
Overland* ...			23,079
Confectionery (exclusive of Jams and Jellies)—			
By Sea ...	...	7,648	44
Overland* ...			12,775
Lime—			
By Sea ...	...	429	...
Overland* ...			223
Matches—			
By Sea ...	20,627	56,413	935
Overland* ...			73,347
Pickles and Sauces—			
By Sea ...	204	3,663	70
Overland* ...			1,538
Saddlery and Harness—			
By Sea ...	571	772	11
Overland* ...			1,877
Soap, Common—			
By Sea ...	1,286	12,787	835
Overland* ...			25,607

* i.e., To other States in the S.A. Customs Union,

Agricultural Education.

AN INTERESTING ADDRESS.

PERHAPS in no sphere of progress is the yielding of the old to the new more noticeable than in that of agriculture. One of the oldest of arts, it is one of the newest of sciences as such. The general acceptance of the fact that agriculture is progressive, and the recognition of the real and practical value of the results of scientific workers therein, are resulting in an increasing liberalism in educational methods. In many schools in America, Europe, and elsewhere, the first principles of agriculture are taught; and great Colleges devoted exclusively to agriculture and allied subjects are springing up in many parts of the world.

Indicative of the significance of this great change is an address delivered by Mr. W. M. Hays, the U.S. Assistant Secretary of Agriculture, before the Pennsylvania State Board of Agriculture at the beginning of the year, on country life education. Mr. Hays pointed out that the educational philosophy of the older Church-governed schools has been powerfully modified by research in the sciences and by development in the industries, arts, and professions. The curriculum once confined to classical learning has broadened out so as to cover the practical as well as the theoretical and the aesthetic. When the older philosophy met the problems of technical education, it said: "Educate the man first and the specialist afterwards." Its plan was to give the man a general college course and give him his technical work in a graduate course. That plan, of course, limited education to college men. It was aristocracy of education for the few in the professions. The broader plans coming into the American schools have been largely thrust upon the school men by men of affairs. The success of combining industrial, technical, and scientific studies with the general studies, thus brought about, often under suggestions from school men, shows that the philosophy of many of the older educators was wrong. The Congress of the United States, by passing the Land-Grant Act of 1862 establishing State Colleges of Agriculture and Mechanic Arts, did more than all other agencies to broaden the philosophy adhered to by the older schools. As the management of a great railway system is willing to make expensive surveys preparatory to the proper construction at not too great cost of proposed improvements in order that larger net profits may accrue to the railway, so liberal legislators are ready to have the people's money collected and expended in making the people more efficient in creating and enjoying wealth.

The little rural school, so long the most backward in catching step

with modern progress, is beginning to take new form. Education in agriculture and home economics, once it is fairly started toward all farm boys and girls, promises to be too strong for the conservation of even the isolated rural school, which has amply demonstrated that in its present form it cannot properly handle these two new lines of work. It has been shown that the rural school needs to be born over into a new life which will fit it for its part—a most important part in the evolution of modern agriculture and modern country home-making. The one-roomed school must become the four-roomed consolidated school so that a man trained to teach agriculture and a woman trained to teach home economics, may here find that fair wage and that long tenure of office which will warrant them in thoroughly preparing for their important tasks. The faculty of four or five teachers can conduct a ten-year course extending through the eight primary school years and two years of the high school for the 150 children from as many farms in an area of 25 square miles. The cottage of the principal; the plantations of timber, fruit, vegetables and ornamental plants; the plots for field crops, fertilizer demonstrations, and farm-management lessons; the laboratory and practice room; and the vital connection the teachers can have by co-operating with parents in the work on the farms and in the homes, will serve to weave into the pupils' nature the elements of a true education in country life. With the schools thus organised, there is provided in the country a far broader child life than has yet been conceived for city youth. How can the nation better expend some of its wealth, Mr. Hays asks, than by thus making provision for well-nigh ideal conditions of fatherhood and motherhood in our country homes?

Country-life education has not had the advantages of centralised population and wealth. It has not developed the needed leaders. Its problems have been more difficult; its organisation has been more slow. While the State Colleges of agriculture and mechanic arts were designed by Congress to keep agriculture at the front, some of these institutions failed for a quarter of a century and more to make a success of their agricultural instruction. Many causes operated, Mr Hays says, to retard the successful development of collegiate courses in agriculture. General education requiring only class-rooms, chairs, blackboards, and books, and scientific education requiring in addition only laboratories, became first installed in many of these institutions and long held the chief place in the the minds of the college presidents and boards of trustees. Entering vigorously upon agricultural education necessitated the additional expenditures for practice laboratories and practical work on the farm, and for expensive herds of live stock and for other costly equipment. The college faculty, most of whom were educated in older schools, could not resist the temptation to enter a race for large numbers of students with general colleges, thus hoping to gain favour with legislatures, and most of the funds were used for studies which could easiest be made popular. Following the ideals of the older educators, the technical and practical

studies in agriculture were at first put forward at the top of the collegiate courses. The assumption is now proved erroneous that the farmer should be afforded as long a course of college study as persons preparing for the technical professions. At first there were not so many positions open to the trained agriculturist as to the graduate of the general and scientific courses, which became popular as preparatory collegiate courses for those desiring to take their graduate work in law, medicine, or other profession. Lack of a substantial body of agricultural knowledge and business principles in pedagogic form was also at first a very great hindrance to the development of education in agriculture. Students, seeing the halting and unsatisfactory character of instruction in agriculture, naturally flocked to the courses of study which seemed to give them individually the best opening. Presidents and boards of trustees, following the lines of least resistance, responded to the development of general and mechanic arts courses and failed to secure from the legislators the large necessary equipment for agricultural education.

During the last one or two decades one State College after another has succeeded in bringing forward its agricultural instruction, and to-day success has been reached in a large proportion of these institutions, giving assurance that this class of collegiate education has a grand future.

Success had hardly been attained in collegiate courses in agriculture, Mr. Hays said, when secondary schools for agricultural education began successfully to develop. In 1888 the University of Minnesota began an experiment at developing an agricultural high-school course. Just as Congress by its Land-Grant Act forced Colleges of Agriculture upon the States, this agricultural high-school movement was injected into the school system upon the initiative of farmers and business men. Up to the present between thirty and forty agricultural high schools have been established in the United States.

In one line of country-life education school men and non-school men have together taken up the practical in school work. Farmers and educators together have entered upon the development of rural schools, so as to have them cover agriculture and home economics as well as the Three R's. Thus the school people are especially championing the consolidation of rural schools, and the farmers are laying stress upon the introduction of agriculture into all rural schools. Both classes are rapidly coming to favour both propositions. The farmers are coming to see that agriculture cannot be successfully introduced into the one-room rural schools, and the teachers are coming to see that agriculture and home economics are to have very strong positions in the primary country-school curriculum alongside the Three R's.

The need of a unified system of agricultural education with rural schools, agricultural high schools, and colleges of agriculture, articulated throughout as are the three classes of primary, secondary, and collegiate schools devoted to the education of the city or non-agricultural classes, is

gaining wide recognition. Courses of study for agriculture and for home economics covering the sixteen years of primary, secondary and collegiate work have been designed, demonstrating that a unified system of education can be built up for country people and for the professional or technical classes needed in building up the rural industries. To develop country-life education as instruction for the city people is developed, two important changes, Mr. Mays pointed out, are necessary. First, there is needed in every rural Congressional district an agricultural high school with capacity to accommodate several hundred students, and, second, rural schools should be consolidated. In these two points unanimity of opinion is being slowly but surely reached by those who have paid most attention to the subject; and the next large public expenditure for education made by the American people, Mr. Hays suggests, should be for the consolidation of the rural schools, the development of agricultural high schools, and the development of industrial work in the country-life and in the city-life schools.

It is easy to believe that if a way appeared whereby the necessary funds could be provided, all would agree to these important developmental changes. "Our farmers say," remarked Mr. Hays, "that they cannot afford the expense of discarding the little rural schools and erecting fine central school-houses, and assume the additional annual expense of hauling their children to and from the consolidated school. Our States even in these prosperous times feel conservative in appropriating the money to equip each of several agricultural high schools and the money necessary for the current expense fund of each such school. Our cities and towns during the period when their development expenditures for streets, sewers, waterworks, and general school buildings, are large, do not feel that they can add to their budgets large items to equip and maintain instruction in mechanic arts and home economics. The States and cities argue that even if free industrial education would pay the community, its cost is more than their present financial ability will warrant."

"Our Statesmen and our educators have before them no more important problem than that of financing a plan of industrial education which is educationally correct," said Mr. Hays, in conclusion. "More experiments are needed that we may know how to develop industrial education. Of special importance are experiments to determine how best to organise education in agriculture and home economics in consolidated schools. Pennsylvania's law, passed several years ago, providing for the consolidation of rural schools, should furnish excellent conditions for such experiments. The rural school, being far the most important of all schools devoted to country life, should be studied by actual experiments. No other one subject in agriculture is so much in need of investigation. Possibly legislative bodies and men in practical affairs must here make the first move, as in the creation of agricultural colleges and as in financing agricultural high schools."

Agriculture in the O.R.C.

PROGRESS IN 1905-6.

SITUATED on a high plateau at an elevation of from four to five thousand feet above sea level and comprising an extent of country covering 50,000 square miles, the climate and situation of the Orange River Colony leave little to be desired as a place of residence for white people and as a breeding ground for live stock of all description. As a country for the farmer to make his living in, it offers many inducements and several drawbacks. That the former outweigh the latter has been proven by history, for in the great majority of instances a man of average ability and energy with a moderate capital and who applies himself judiciously to farming pursuits for a period of, say, ten years, will, by the end of that time, be ensured of a comfortable income.

Such is the opinion of the Director of Agriculture of the Orange River Colony (Mr. W. J. Palmer). "We have now a splendid class of men," he says—"British and Dutch—most of them progressive, many of them energetic, and nearly all keen to develop their farms and make the best out of their surroundings. The majority of these men have had a hard fight and the end may not be yet, but it should be remembered that South Africa is a land of surprises, and when the rainy seasons come again those who have held out will reap their reward."

According to the Second Annual Report of the Department of Agriculture (1905-6), a copy of which has recently come to hand, the Orange River Colony, in common with the rest of South Africa, is making good progress in the development of its agricultural and allied resources, and in the improvement of stock farming conditions.

The Colony was singularly free from animal diseases during the year under review; which happy state of things was undoubtedly due, to some extent, to the preventive measures adopted by the Department in prohibiting or restricting the movement of stock from other South African Colonies where disease was known or suspected to exist, in taking prompt action where contagious disease of any nature was reported, and in giving immediate attention to enquiries or reports from farmers as to loss by death of animals from obscure causes.

Considerable attention is to be given in the future to the development of the wool industry on sound and practical commercial lines. On the 2nd April, 1906, a large number of circulars was distributed throughout the country inviting orders for Australian merino rams and ewes to be imported under Government auspices, and the opportunity was given to farmers to choose either the robust-woolled, large-framed Rambouillet or

the finer-woolled, smaller-framed Tasmanian type, which were recommended as most suitable for the requirements of the O.R.C. The result of this circularising was that orders were received from the farmers of the Colony amounting in value to £28,442, being for the purchase of 2,031 merino rams and 5,211 ewes. The importation of these sheep should give a great impetus to the wool industry of the Orange River Colony.

The breeding of live stock is a thriving industry to a greater or lesser extent in all districts of the Colony. The only exception to this general rule is, perhaps, that small portion in the north-west of Hoopstad and Kroonstad, and the south-western portion of Vredefort, where the grass is stated to be too coarse for sheep and horses.

Dividing the crops of the Colony into two classes—those which can be grown on dry lands and those which can only be produced under irrigation,—the Director states that in ordinary or average years wheat, oats, mealies, kafir corn, potatoes, and the hardier varieties of fruit and roots can be grown in particular districts and marketed at a fair profit, but that during the past four years it has been a difficult matter to realise profits, especially on wheat and oats: the result of which has been that many farmers who formerly devoted a considerable extent of land to growing winter wheat have abandoned the crop altogether. In the Vredefort district, along the Vaal River, tobacco grows luxuriantly on dry lands and yields profitable returns to the farmer. It is hoped that cotton will be found to be a successful crop in this and other localities. Nearly every plant which is found in semi-tropical climates can be grown during the summer under irrigation, the Director remarks; and in the winter, wheat, barley, oats, and other hardy crops which are not injured by frost make a firm stand and come to maturity shortly after the warm weather arrives.

The great importance of a carefully-devised policy of water conservation is touched upon in the Report; for, as the Director points out, situated as the Colony is upon a high inland plateau and subject to intermittent and variable rains, it is bound to experience long periods of drought, followed by seasons of excessive rain, the great portion of which, owing to the elevation of the land, rushes into the rivers and is lost, and it would therefore seem, indeed, that on a successful scheme of water conservation will depend to a very large extent the future welfare of the country.

Substantial progress was made during the year by the Forestry Division; and while the conditions for successful tree-planting were most unfavourable, farmers showed an increased interest in the planting out of trees, which was continued despite climatic difficulties. "If trees are planted for nothing else than as shelter for stock against bitter winter winds," remarks the Director, "they will in a very few years repay any expense and labour involved, but it is pleasing to find that shelter belts are not the only object sought, for trees are being planted in the towns, on the farms and at the railway stations for decorative and shade purposes,

which will in time result in a happy change from bare veld and plain unsightly towns and houses to attractive bits of scenery and tree-shaded streets and gardens."

Bound up with the Report of the Director of Agriculture are the Reports of the Divisions of Experimental Farms and Live Stock, Horticulture, Forestry, Biology, Agronomy and Seeds, and Meteorology, the Veterinary Division, and of the Chief Stock Inspector. The volume contains many interesting and well-printed photographic illustrations, and is got up in a neat, handy style.

The Natal Government Museum.

RECENT PUBLICATIONS.

EVERY Natalian must feel a sense of pride as he contemplates what may be termed that crystallisation of the Colony's recognition of the value of scientific progress—the Natal Government Museum in Pietermaritzburg. Outwardly a massive, imposing edifice, emblematic of the grandeur of scientific research, there is, inwardly, every evidence of the industry of its Director, Dr. Ernest Warren, in building up a collection that promises to be second to none in South Africa.

The Director has recently issued the "Second Report of the Natal Government Museum," for the year ended 31st December, 1905. We cannot help remarking upon the belated appearance of this report, which should have been published many months ago. The volume consists of the Report of the Trustees and the Report of the Director, with a Financial Statement, a Catalogue of the Museum Library, and Catalogues and Lists of the additions to, and withdrawals from, the Exhibition Collections in the Museum.

Some idea of the progress which has been made may be gained from the figures relating to the additions of specimens to the Museum since the previous Report. Under the heading of ethnology there were 145 additions; mammalia, 98; birds, 81; anatomy, 82; reptiles and fishes, 19; invertebrates, 425; palaeontology, 4; and geology and minerals, 1,445. The various departments of exhibition collections have been enriched and improved in various ways; the collection of specimens by the Museum Collector (Mr. F. Toppin) has been proceeded with; and various educational and research work has been carried on. The Library, the formation of which was commenced soon after the completion of the present Museum building, now contains many valuable works of reference, monographs, and papers on subjects of interest to the Colony, some being donations but most purchases.

The Trustees are now issuing a journal, styled the *Annals of the Natal Government Museum*, of which it is proposed to issue, if possible, two parts a year. We have been favoured with a copy of the second part of the *Annals*, dated March 8th, 1907. This issue comprises "A Contribution to the Study of the Characteristics of Larvae of Species of Anophelina in South Africa," by Ernest Hill, D.P.H. Camb., and L. G. Haydon, M.B., C.M., etc.; a paper on the "Language of Colours amongst the Zulus expressed by their Bead-word Ornaments; and some General Notes on their Personal Adornments and Clothing," by the Rev. Father Franz Mayr; a note "On Two New Reptiles from the Karroo Beds of Natal," by R. Broom, M.D., D.Sc., C.M.Z.S.; the second part of some notes "On Entomostriaca Collected in Natal by Mr James Gibson," by G. Stewardson Brady, M.D., LL.D., etc., a paper "On *Parawrightia robusta* gen. et sp. nov., a Hydroid from the Natal Coast; and also an account of a supposed Schizophyte occurring in the Gonophores," by Ernest Warren, D.Sc., Lond.; and notes on "The Variation in the Arrangement of the Capitulate Tenacles in the Hydroid, *Halocordyle Cooperi*" and "The Larva of a Fly (*Sarcophaga* sp.) occurring in the Human Intestine," also by Dr. Warren.

From a popular point of view, Father Mayr's paper is perhaps the most interesting. After describing the various articles of ornament for which nature supplied the Zulu with material previous to the arrival of the white man, Father Mayr shows how the advent of coloured beads aroused the sympathy of the Zulu and provided him with a new field for his imagination and skill. The natives have given each colour of beads a special name and meaning; and they have thus invented a new kind of "language of colours." As an example the author gives a translation of the sentiments expressed by the beads in a certain "letter," as follows:—"My heart is pure and white in the long weary days (white beads). My eyes are sore and red by looking out for you so long (red beads). *Nang'ubal'abuyise*—i.e., here is my letter to you. I have become quite lean and sickly (green beads). If I were a dove I would fly to your home and pick up food at your door (blue beads). Darkness prevents my coming to you (black beads). But my heart is pure, etc., etc., and the whole message would be repeated several times."

The journal is well got up, and contains numerous plates. We would, however, suggest to the Trustees that the printing, both of the *Annals* and of the Annual Reports, be done in Natal in future. There appears no reason whatever why the work should not be done in the Colony, as there is plant in both Maritzburg and Durban for the execution of the finest class of work. If the plates could not be prepared here, they could be executed separately in England and bound up with the text here. The question of cost should not be allowed to count, especially in these days, when every penny that can be kept in the Colony should be spent locally and not sent overseas.

Sanitary Relations of Milk Supply.

UNITED STATES OPINION.

THE Commissioners of the District of Columbia, United States, have appointed a committee composed of scientists, physicians, veterinarians, milk producers and dealers, attorneys, and business men, to consider and report upon the local milk supply, to advise what steps should be taken to improve it, and to suggest legislation to that end. A sub-committee, appointed to inquire into the sanitary relations of the milk supply, have recently issued a report on the subject. Attention is drawn in the report to the remarkable fact that every attempt to improve the purity of this valuable article of food should be promptly opposed by the commercial industry. The men engaged in this industry evidently do not know, it is remarked, and cannot know, that such hydra-headed diseases as cholera infantum, scarlet fever, and diphtheria have been disseminated by the milk supply, that typhoid fever epidemics have been thus caused, and that milk may be the vehicle of the germs of tuberculosis and other infectious diseases and morbid agents.

As the report points out, pure, natural milk can only be secured at dairies with sanitary buildings, a pure water supply, healthy, well-fed, and well-cared-for, cows, a well-equipped and well-kept milk room, provisions for thorough cleanliness, intelligent and conscientious people in charge, and clean methods throughout. There are a number of persons who, as a result of the training received at the dairy schools, make an honest effort to place on the market milk obtained under such conditions, but by far the majority of milk producers are indifferent to hygienic requirements and would prefer the good old days when there was no control even to prevent the shameful adulteration of milk by the intentional dilution with water, the removal of some of its cream, or the addition of skimmed milk. Dr. H. W. Wiley, Chief of the Bureau of Chemistry of the U.S. Department of Agriculture, reports that 'during the last few months his Bureau examined 327 samples of milk bought in Washington, of which 56, or a little over 17 per cent., had been skimmed or watered; and of 96 samples of cream, 38, or 39.5 per cent., were below the standard required by law. The records of the Health Department of the District of Columbia show that, during the past five years 28,859 samples of milk were examined, and that of these 6,801, or 23.5 per cent., were below the fixed standard, and in 1,305 instances prosecutions for the sale of adulterated milk were presented in the Courts. These robberies, largely made up of the pennies of the poor and sickly women and half-starved children, amount in money

value to considerably more each year than the entire cost of the Health Dept., D.C.

The report considers that matters of this kind should not be left to the individual dealers, but the principle which ought to be carried out should be embodied in effective laws and accepted and enforced in a practical sense.

It is pointed out that frequent inspection of the dairy stock will be a source of ultimate profit to the owner, as the presence of tuberculosis or any other communicable disease endangers his entire herd, and great losses can be prevented by the prompt isolation or extermination of the first cases. The farmer will likewise find that, if he houses his cattle in spacious, well-lighted, and well-ventilated stables, or even in properly constructed sheds, there will be less tuberculosis and sickness among the herds.

MILK AS A CAUSE OF DISEASE.

As evidence that milk is a cause of disease, the report contains the following points:—

1. It has long been shown by the most painstaking investigations, extending over a long period of years, that certain diseases in the animal are communicable through the medium of the milk, this being especially true of tuberculosis, foot-and-mouth disease, anthrax, and small-pox; and that diseases like garget, gastro-enteritis, and septic fevers in the cow will render the milk moribific to man.

2. It has been shown that animals which have fed on poisonous forage plants, or have been treated with strong medicaments, are disqualified from producing a pure or sound milk.

3. During the past twenty-five years there have been published in the different medical journals the histories of 195 epidemics of typhoid fever, 99 of scarlet fever, and 36 of diphtheria, all traceable to the milk supply. In the recent exhaustive investigation conducted by the highest health authority in the United States, viz., the U.S. Bureau of Public Health and Marine-Hospital Service, the Commission definitely traced 85 of the 866 cases of typhoid fever (about ten per cent.) in the District of Columbia to the use of infected milk.

4. It has been shown that in the District of Columbia about one-fourth, and in the country at large one-sixth, of all the children born perish before the completion of the first year; that nearly one-half of the deaths in children under one year of age are caused by gastro-enteric diseases, chiefly infantile diarrhoea; and that of the 54,047 infantile deaths which have been investigated at home and abroad with reference to feeding, 86.6 per cent. had been artificially fed, all of which points with more than mere suspicion to the fact that the moribific agent is introduced into the body with the food—cow's milk.

TEMPERATURE OF MILK.

An important point is brought out by the report with regard to the temperature of milk, namely, the importance of cooling the milk and keeping it at a temperature below 50 deg. F., except as may be necessary in the process of pasteurization or sterilization, until the milk is delivered to the consumer. The reason for this, it is explained, is that milk, when it leaves the udder, contains very few germs: the majority gain access during handling, especially when the milking is done in a dusty stable, or from excrementitious matter adhering to the teats and udder of the animal. These germs multiply with astonishing rapidity whenever the temperature of the milk is above 50 deg. F., and if the disease germs are present their proliferation augments the chances of infection. A temperature of 58 or 60 deg. F. will not subserve the interests of public health. According to Harrington, "Petruschky has shown that at a room temperature a streptococcal content of 300 per cubic centimeter may increase in twenty-four hours to one of 10,000,000; but the same milk kept at 50 deg. F. yielded but 30,000, or but three one-thousandths as many."

The use of ice will result in a slight increase in the cost; but, as Professor Harrington says, "the public needs proper education that clean milk is a necessity, and that infant sickness and funerals can be reduced at least 40 per cent." Continuing, he remarks: "A model farm properly managed certainly cannot compete on equal terms with a filthy farm, where no attempt is made to conduct the business in a decent manner, especially if customers are indifferent. The dirty producer can even afford to cut prices and take customers away from the other, if customers care to save a cent and make it up in pus and cow dung."

CERTIFIED MILK.

It was in consequence of a just appreciation of these principles that the so-called "Certified Milk" came into existence in the United States about ten years ago. Responsible bodies of citizens interested in an improved milk supply organised in different cities milk commissions. Such commissions usually select and secure the advice of four experts—a veterinarian, a physician, a bacteriologist and a chemist—all more or less familiar with the conditions and possibilities on dairy farms. The commission sends to each dairyman who supplies milk to the city a circular naming all the particular conditions which should be found on every farm where milk is produced for city use, and announcing that where any dairyman notifies the commission that he is fully conforming to the conditions specified, or endeavouring to do so, his dairy will be inspected, and if it is found to comply in letter and spirit to all the requirements, his name will be placed upon an approved list and he will receive an official endorsement to the effect that his dairy farm and the herd thereon have been thoroughly examined and found to comply with the conditions re-

commended by the commission. These conditions include a healthy herd, the use of pure feeds, appropriate stabling and care, pure water, and clean and prompt handling of the milk, which is of good composition and quality and as free from pathogenic and unnecessary bacteria as reasonable safeguards can provide. The attendants are cleanly and free from communicable diseases, and all milk is promptly cooled immediately after milking to a temperature of 50 deg. F. Every intelligent dairy farmer insists upon cooling his milk as soon as the bucket is full.

The inspections are made unannounced and at irregular intervals, so as to insure maintenance of the prescribed standard. Any neglected condition is immediately reported to the commission, which decides whether or not the cause is sufficient to withdraw and cancel the last certificate issued.

The commission is of the opinion that milk should never be sold by grocery stores or milk shops unless it has been delivered to such establishments in original sealed bottles, and then only when there is provision for maintaining the milk at a temperature of 50 deg. F.

The following recommendations are made as immediate safeguards against milk-borne diseases:—

“Do not patronise a milk dealer at any price whose milk after standing over two hours reveals a visible sediment at the bottom of the bottle. It is evidence of dirty habits, extremely suggestive of danger, and entirely preventable by clean, decent habits, without greatly increasing the cost.

“Subject your milk to home pasteurization, by simply bringing it to the boiling point; and after cooling keep the milk on ice. This will destroy germ life and reduce the chances of milk-borne diseases to a minimum; and if we can reduce our typhoid-fever rate even only ten per cent. by this simple method, not to mention infantile diarrhoeas and other infectious diseases, it is clearly our duty to do so.”

In dehorning calves the use of caustic potash is recommended by an exchange. Clip the hair from the skin and moisten the flesh. Dip the stick of caustic potash in water until somewhat softened and rub in on the moistened surface of the horn. This should be rubbed six or eight times until the horn becomes somewhat sensitive. The operation requires only a few minutes. A scale usually forms over the horn and drops off within a month or six weeks. But results are obtained when this substance is used as soon as the horn can be located. This can usually be done three or four days after birth.

Co-Operation in the Northern Districts.

FORMATION OF AN ASSOCIATION.

AN association, to be known as the Northern Districts Co-operative Agricultural Association, is now being formed in the Vryheid and Paulpietersburg Districts, with the head office and depot at Vryheid. It is proposed to raise the capital by an annual subscription of £1 for either three or five years, after which the subscriber becomes a life member.

Negotiations have advanced to such an extent that it was possible to hold a congress of farmers' delegates on the 14th September, to draw up the rules and regulations of the proposed association.

It would appear that the value of co-operative principles is fast coming to be recognised among the farmers of the Northern Districts, judging from the success which seems to be attending the efforts of Mr. R. Levisohn and others in the direction of the organisation of agriculture in those districts. It may be remembered by our readers that the original intention was to form a co-operative tobacco factory; but the idea has apparently been so well received that by request it has been extended to all kinds of produce.

Mr. E. R. Sawyer, Director of Experiment Stations, has recently toured the Northern Districts, accompanied by Mr. A. von Levetzow, Chairman *pro tem.*, and Mr. R. Levisohn, Secretary *pro tem.*, delivering lectures and giving advice on tobacco cultivation. The various meetings have been well attended, and much interest has been evinced.

The final meeting of the series was held at Vryheid. Mr. A. von Levetzow took the chair; and after declaring the meeting open referred to the necessity for co-operation for the farmer to keep abreast of the times. The improved and more progressive mode of farming should be adopted, and this could only follow when sufficient encouragement was given to the farmer, by finding a market for his stuff. But to secure a market, large quantities must be available. An individual farmer could not produce such quantities, but by co-operation large supplies would be available for marketing. The difficulty was, not to create a demand, but to satisfy the demand that already existed.

The speaker quoted the examples of Denmark, Holland and Australia, and showed the changes which had taken place as a result of the adoption of the principle of co-operation. To-day, he said, Australia was exporting in shiploads and was a flourishing country. We, however, have to import our butter from that country. Instead, before we had the Tick Fever here, we should not only have been producing sufficient for local consumption, but should have been exporting as well.

The speaker then went on to discuss the formation of the proposed Land Bank, and pointed out that it was that district that had first taken steps to bring the matter prominently before the Colony some two or three years ago.

Mr. Sawyer then spoke, his address being translated into Dutch. He declared that, as a result of the tour just completed, he took a very hopeful view of the local tobacco industry; and went on to explain that he had gathered his experience from the effects, etc., to be observed in the other Colonies as well as in Natal. Tobacco culture had proved to be the chief remedy the farmers of Rhodesia had to rely on to escape the impending disaster due to the invasion of that Colony by the East Coast Fever, and people should profit by this successful experience.

The Northern Districts and the neighbouring Transvaal territory (Piet Retief and Swaziland) possessed great natural advantages for the cultivation of tobacco, but the first step was to build up a definite commercial organisation such as existed in the Cape and other Colonies. Tobacco was being grown in Vryheid and in other districts of Natal which was purchased by Transvaal buyers at from 3d. to 6d. per pound, and after treatment in the Transvaal factories was actually re-introduced into Natal as a finished article, and sold at 2s. to 3s. per lb. This rather startling state of affairs was due to lack of commercial organisation on the part of Natalians.

At the S.A. Produce Exhibition, the judges had found certain good qualities in the South African tobacco, chiefly in connection with its burning and flavour, but had pointed out that it would be much improved if the colour were lighter and the strength milder. The farmers must grow for the market and suit the buyers, and for that reason the speaker was circulating leaflets in English and Dutch, showing how this could be accomplished. The Government had imported the best kinds of seed, manure, etc., for the purpose required, and farmers could purchase the same at Vryheid or elsewhere direct from the Government at cost price. The rising generation clearly preferred cigarettes and light pipe tobacco. There was a great field in the demand for cigarette leaf, most of which had at present to be imported, in spite of a 3s. per lb. duty, though certain popular brands (*e.g.*, Aroma, etc.), were now being made from South African leaf. There was also a large demand for light coloured mild pipe tobacco, and the Department held stocks of five kinds of this class of seed.

But though good seed might be nearly half of the battle, still, curing, soil and suitable manures were also important points. It was found that light granite soils gave the best cigarette leaf, when suitably manured. The rankness and coarseness of South African tobacco was due to the use of kraal manure.

If kraal manure had to be employed, it should be old and well rotted,

but it was much better to employ selected fertilisers. Wood ash was also good. The speaker went on to explain what advantages were gained by the fire-curing method, and showed an illustration of the barn recently erected at Weenen. After drying in the barn for about six days, the leaf was steamed and baled, and then left to slowly sweat. One drawback to rolling tobacco was the impossibility of sorting tobacco after it was once in roll.

In Rhodesia, where the system had been thoroughly elaborated and tried, central warehouses had been established where the product was handled for the grower, the bad leaf eliminated and used for dip, etc., whilst the rest was sorted, graded and baled. When it was inspected by buyers even from London and America, it was bought in large quantities. Buyers would not go round outlying districts buying small quantities of ungraded leaf, so that these central warehouses fulfil a most important function in the industry, and the cost of handling was less than $\frac{1}{4}$ d. a lb., whilst far better prices were obtained, and larger orders placed. Later on, no doubt, manufacture would also be carried on in the warehouses.

As for cultivation, the greatest losses occurred in the seed beds, consequently care should be exercised in this department. The second and third crops should only be used for the native trade. There was no better way of ruining the name of a tobacco than by mixing successive crops together.

As for manures, lime was required to give a white coherent ash, while potash made the leaf turn well and evenly. Tobacco suffered very little from drought, but, on the other hand, it would not do well on badly drained soil. Experience in this district seemed to point to the fact that water (irrigation) makes the tobacco milder. At any rate, water seemed to be useful when transplanting.

Mr. Levisohn was then called upon by the Chairman to address the meeting with regard to the co-operation proposals which were being put forward. A chief committee, Mr. Levisohn said, would have to be elected in town, and every ward would have a divisional committee; and each ward would also have one or two, or even three, depots according to size, with a chief depot in Vryheid.

Under the existing difficulties attending upon transport, each ward, at the beginning, would be given a span of mules and a wagon, promised by the Government.

Anyone requiring mules for ploughing would make his application to the Divisional Committee; and should he be unable to pay for the hire, a printed form would have to be signed by him to the effect that his crop would be delivered to the Association, when, on realisation of his produce, the charges would be deducted. The same principle would apply to transport, but as the poorer farmer in most cases would not have sufficient to make up a load (6,000 lbs.), the wagon would deposit the stuff at the

nearest depot, and go out again collecting from others, until a full load had been secured, when it would be transported to the town depot to be dealt with. The cost of transport would then be calculated according to the weights of the various lots and charged to the respective accounts. By this method the small farmer would be able to have his produce brought to the market without paying any more than if he had his own transport.

Upon delivery of the produce an advance would be made if asked for, in accordance with quantity and ruling market prices, the balance to be paid when sold. But should there be anybody to whom the advance would be insufficient for his requirements, he could always obtain goods on the receipt or coupon handed him for his produce by the society.

The matter of dealing with tobacco differed somewhat from that of other classes of produce, continued the speaker, inasmuch as with the latter the society was merely an agent for the farmer, charging its commission, whereas the tobacco would be purchased outright.

On delivery of the tobacco the ruling market price would be paid in cash and a coupon issued certifying the quality and quantity supplied. The tobacco would then be treated, packed in bags, and sold. After six or twelve months a balance sheet would be prepared and the net profits derived from the sale of the tobacco divided among the suppliers of the tobacco over and above the price paid at the time of delivery.

Large quantities of the weed were constantly being sent out of the district, the usual price being sixpence per pound. It must go somewhere to be cut, and was eventually sold from 2s. or 2s 6d. per lb. Thus it was the manufacturer who was making the profit—not the producer. And why should this be, the speaker asked, if through co-operation they could do this themselves and keep the money in the district?

Various large deals in tobacco, contracted by the speaker, were then quoted in order to show the good quality and increased demand.

The speaker went on to show that by the Society's handling larger quantities the rail and other expenses would be reduced; and a reduction in expenses meant an increase in profits. He showed further that tenders or contracts could be entered into later on, when once the supply had been established.

Having pointed out the advantages to be derived from the formation of such an association as the one suggested, he pointed out, on the other side of the question, that their responsibility, in case of failure, would be no more than their individual subscriptions, viz., £3 or £5, as might be decided. There were no shares, and when once a member's subscription was paid his responsibility ceased.

Various questions having been answered, the election of two delegates and a divisional secretary was proceeded with; when, after votes of thanks to the Government and Mr. Sawyer, and also to the Chairman and Mr. Levisohn, the meeting dissolved.

Profitable Dairying.

RECORDS OF DAIRY COWS.

PERHAPS in no department connected with the farm is there more need of absolute data than the dairy; and probably in no branch of agriculture is there to be found a wider range of profit. Illustrative of this are the results of an investigation conducted by *Hoard's Dairyman* (U.S.A.), into the records of a hundred creamery patrons. It was shown that one of them made 2 dollars 30 cents for every dollar invested in feed for his cows, while a neighbour made one dollar, and another lost 50 cents. All had the same soil and the same market. Not one in ten read any dairy literature, and thirty-eight out of the hundred kept cows at an actual loss.

In order to show dairymen the importance of keeping records complete enough to give the dairy performance of every cow in the herd, thereby making it possible to weed out the unprofitable animals: to induce dairymen to keep records, not only for the additional profits, but for the increased interest which they give to all connected with the work and the business methods which they have a tendency to promote; and to show the possibilities of production with different grades and herds of cows under different conditions, thereby giving encouragement to the farmer and an incentive to higher standards and greater profits, a Circular has been issued by the U.S. Bureau of Animal Industry, from the pen of the Assistant Chief of the Dairy Division of that Bureau.

It is pointed out that records of the performances of dairy cows form the only accurate and safe basis for judging their value. It is a constant aim of progressive dairymen to improve their herds, and such improvement must depend largely upon culling the herd and getting rid of the unprofitable animals. From the breeders' standpoint records are especially valuable in assisting in finding customers for their stock. A record is also a great help to the feeder. If he knows exactly what a cow is doing, he can prepare the ration accordingly, and often feed more economically. Again, a daily milk record enables a dairyman to detect the approach of sickness in a cow, and thus to take steps to ward it off.

Many of the United States Experiment Stations have shown the importance of keeping careful records of the individual cows, and thus determining which are profitable and which are kept at a loss. At the Georgia Station the best cow in the herd gave 7,968 lbs. of milk, which produced butter worth £24 1s., while the poorest cow in the same herd gave only 2,788 lbs. of milk, with a butter value of only £8 13s. 5d. At the Michigan Station the profit on the milk from different cows varied from £1 5s. 4d. to £19 11s. 10d. At the New Jersey Station the profits

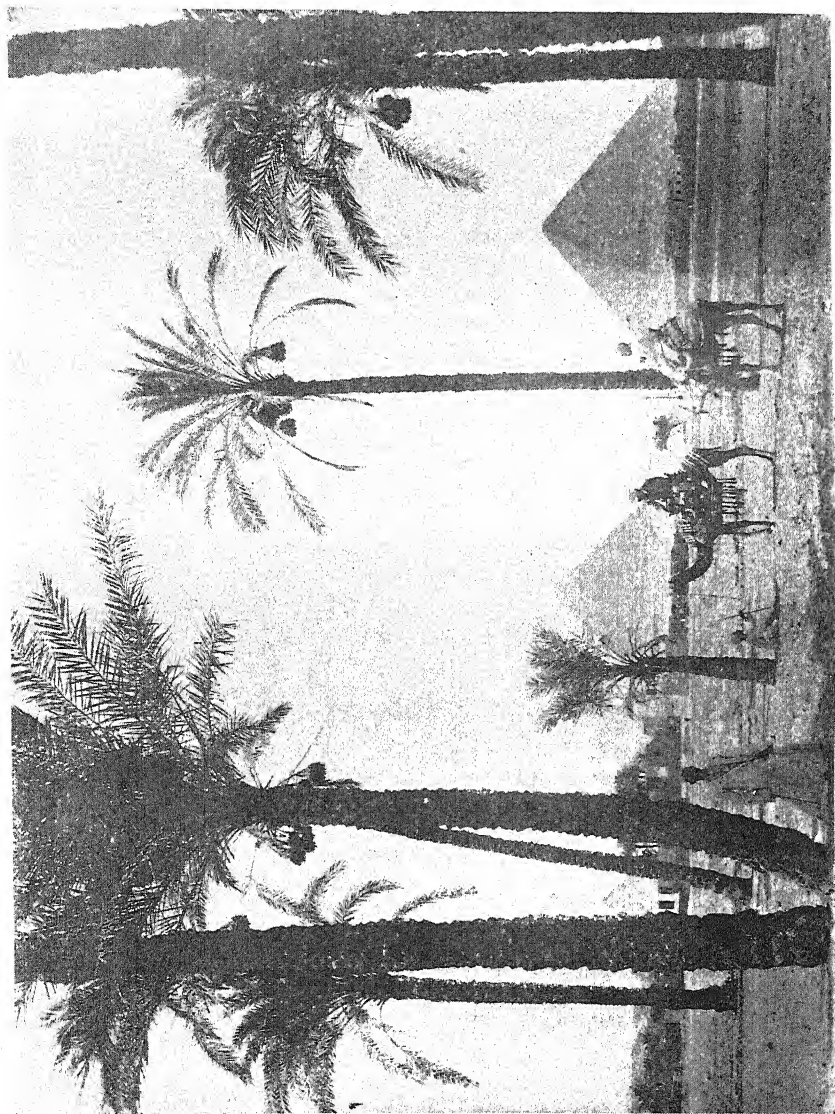
from different cows varied from 6½d. to £10 7s. 2d., when milk was valued at 4s. 2d. a hundred pounds. At the Connecticut (Storrs) Station, during the year 1903 the best cow gave a profit of £11 8s., and the poorest 11s. 6d. In this case the cow gave a profit of nearly twice that of the average cow in the herd. At the World's Columbian Exposition, Chicago, the cow with the best individual record made two and one-third times as much butter as the poorest of the seventy-five.

The Illinois Station, after testing a number of herds in that State, made the following comment:—"Nearly every herd we have tested has proved that some of the cows produce butter enough to pay a handsome profit to the owner, while others that require the same feed, care, and time spent in milking do not make butter enough to pay for the feed they eat. . . . One man who kept twelve cows got more money for the milk of three of them than he did for that of all the other nine put together."

In a general way, of course, farmers know the good milkers in their herds, and in the same general way they weed out those that are considered inferior; but only a few breeders, whether of common or pure-bred stock, use the scales or the fat test to supply definite knowledge. When the milk is not weighed, the amount is almost sure to be over-estimated. The fact that a cow gives 12 to 15 quarts of milk in a day in a certain time, does not prove that she will give 5,000 pounds in a year. The cow must be fed and cared for during the entire twelve months, and the profit or loss depends on what she will produce during the entire year.

"The record of the herd is a matter of the utmost importance," remarks the Circular referred to. "The highest degree of success cannot be attained unless dairymen know the productive capacity of each individual cow. This is necessary as a guide to rational treatment and to insure the greatest profit." The record should include not only the dairy performance, but a concise history and description of each animal. A daily record of the milk yield of every cow and a fat test of consecutive milkings are required if accurate records are to be secured. Samples for this test may be mixed, and this "composite sample" tested, the average being thus obtained. The method is easily learned and practised. With the percentage of fat taken periodically and a summary of the daily yield of milk, the dairyman has a full record of every cow in his herd. In order to give still more complete knowledge, it is recommended that a record—at least approximately accurate—should be kept showing the cost of the feed consumed by each cow, so that the economy of production may be shown.

For the purpose of testing the milk, a simple form of Babcock apparatus—consisting of a pipette for measuring the milk sample, an acid measure, test bottles graduated to ten per cent., and a centrifugal machine for whirling the bottles and contents at a high speed—is recommended. Full directions usually accompany the apparatus as purchased.



DATE PALMS NEAR THE GREAT PYRAMIDS.

While daily records are best, various investigators have recommended methods of estimating the yearly production from a few weighings and tests, a number of which have proved practical and reasonably accurate. The Wisconsin Experiment Station, for instance, recommends weighing and sampling the milk one day each week during the year; the Illinois Station suggests weighing and sampling each cow's milk for fourteen consecutive milkings every seventh week; the Vermont Station recommends that when only two tests of each cow's milk are to be made during the same lactation period in case of fall-fresh cows, the first test should be made eight to ten weeks after calving, and the second test five and one-half to seven months; the Maryland Station decides, after an exhaustive study of this question, that the seventh month in the lactation period would be the best to test the cow when only one test a year is made; when combinations of two tests are to be made at different periods, this Station found that the third and eighth months would be best, and for a combination of tests during three months, the third, sixth and eighth.

A cow's dairy performance cannot be fairly judged from her record for a single year. Dairy cows have their "off years," and this must be considered when cows having poor records are being dropped from the herd. If this fact is not borne in mind, there is danger of selling the best cows.

The following fundamental steps to be taken in improving dairy herds are given by the Circular:—

1. Take advantage of variation. While the tendency of nearly all cows raised is to become average cows, a number fall below and a few reach a yield of 500, 600, or even 700 pounds of butter.

2. Those above the average should be carefully selected and bred with care and judgment.

3. While the test must be used to detect variation and make selections, it is needed particularly to test the progeny, to determine whether the good qualities of the parent have been perpetuated, and to see if any improvement in the off-spring has been made.

4. Feed, care, and management are of the highest importance. Having been carefully selected and having stood the test, the cows must be well fed and cared for if their good qualities are to be retained and improved.

At a special general meeting of the Durban and Coast Horticultural Society, held recently, it was decided to hold two shows during the next twelve months: a spring show of cut flowers on the 25th October, and the annual general show during the third week of April, 1908.

Closer Settlement in Victoria.

CLOSER settlement is now strongly established as part of the policy of the Victorian Government and as a prime factor in the progress of the State. In a paper in *Dalgety's Review* for July, Mr. M. Grant Bruce reviews the working of the Closer Settlement Act and gives a description of what has been effected by its means.

Under the authority conferred on the Government by the Land Act of 1898, four estates were purchased in 1900-1, at a total cost of £208,288. These properties, which covered in extent 10,446, 13,769, 4,246, and 5,108 acres, respectively, were sub-divided into 192 farm allotments, all of which were taken up immediately; and at the present time these allotments support a population of at least 1,000 persons. As a result of the success attending these initial experiments, the Closer Settlement Act was passed in 1904. Under this measure the properties already acquired, together with future purchases, were placed under the control of a Board, known as the Lands Purchase and Management Board. The powers entrusted to the Board enable it to purchase estates, which may be obtained by mutual agreement. Should an owner not consent to any terms, the Board simply reports the case to the Minister for Lands, who, if he deem further action advisable, brings the matter before Parliament. Compulsory purchase does not come within the scope of the Board. Estates are bought on its recommendation, subject to the approval of the Minister, but it has no power to launch into unlimited expenditure; and it has to justify its recommendations by disposing of the properties acquired so that no financial loss results to the State.

The allotments into which estates are divided are strictly determined by the value of the land. The workman, for residential purposes, may obtain up to £100 worth of land; the agricultural labourer, to form a home which in his spare time he or his family may use to supplement his wages, may obtain up to £200 worth; and up to £1,500 worth is the limit for farm allotments for lamb breeding, dairying, farming, intense culture, or any other purpose. It is now generally admitted, however, that this maximum value of £1,500 worth of land allowed a settler is too low. Only the homestead block of a large estate may carry with it land up to the value of £4,000. The half-yearly payments, including interest, are 3 per cent. of the total value of the holding, and these may extend over 31 years, although payments in advance may be made at any time, at the option of the lessee. One-fifth of the total value of the allotment must be expended in improvements: one-third of this amount by the end of the first year,

half by the end of the third year, and the balance by the end of the sixth year, when a negotiable title may be obtained.

The writer considers that, broadly speaking, the Act has proved a success. In its present form, he remarks, however, the Act does not touch the large and deserving class, whose capital is brains, energy, and ambition; possessing perhaps stock, working plant and furniture, but without cash for initial expenses. "It aids the man who should not require State aid—the man who is able to buy land anywhere. New Zealand sets us a more practical example in its system of closer settlement. There a farmer has at first only to pay a low interest charge on the price the Government gives for his land, which enables him to make immediate use of whatever capital he can raise to develop production. Under the Victorian system of early payments, settlers are not infrequently driven to money-lenders to obtain the means to work their holdings. A system which has for its motto the lofty sentiment, 'Permanent settlement, not pecuniary gain,' should have more elastic provisions, and be so adapted as not to press too heavily on the struggling settler at the time when he most needs consideration."

As far as returns have yet been obtained, 183,320 acres have been purchased by Government since the inception of the idea of closer settlement; and these estates cost £1,258,783. The number of applications which have been received amounts to 2,595, to 1,083 of which blocks have been allotted. There are now only 8 blocks left for allotment out of the original lands with which the foregoing figures deal. The total value of improvements effected in respect of these subdivided estates is £110,082.

It is stated that at a recent meeting of the Costa Rican Congress at San Jose, it was agreed to levy a tax of one cent. per bunch on bananas exported from the Republic. This step, it is said, is to be taken as a means of raising sufficient funds to wipe out the large debt that hangs over the Republic.

The imperial cwt. of 112 lbs. live weight may be taken in an averaged animal as representing 64 lbs. of carcass, or dead weight. Prime animals would give a larger percentage of carcass weight, perhaps as high as nearly 72 lbs. in very choice bullocks, and inferior cattle a less proportion, down to 60lbs. per cwt. of live weight.

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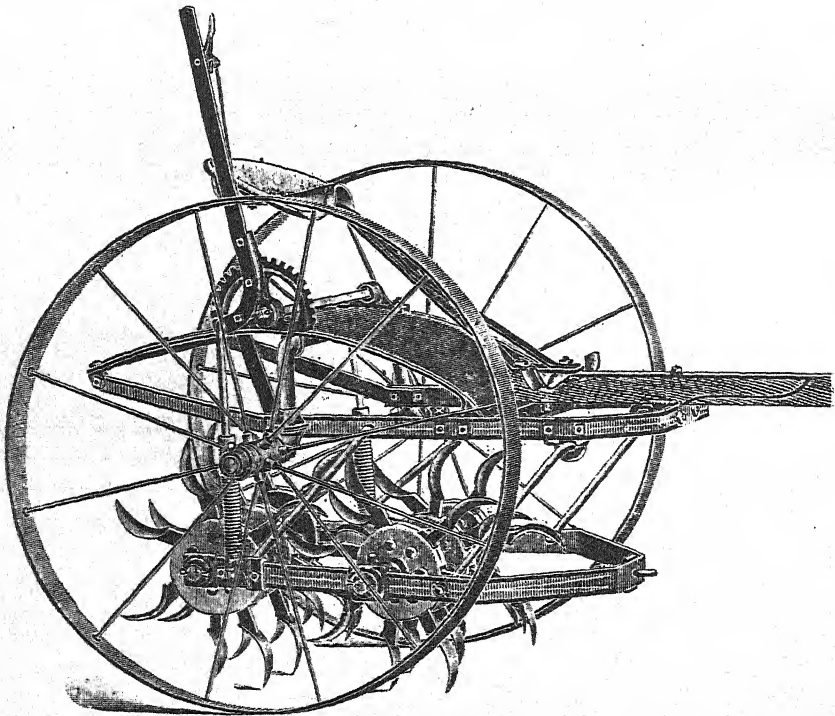
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Agricultural Machinery.

CULTIVATORS FOR LUCERNE AND OTHER CROPS.

WITH the introduction of labour saving and time saving machinery gradually disappear the old-time methods that have characterised the practice of agriculture for centuries past. Modern competition and the general spirit of progress compel the gradual adoption of labour-saving devices; and in all branches of agriculture the older forms of machinery are being gradually improved upon, and new appliances are being introduced.

In recognition of this fact, it will be the policy of this *Journal* in future to endeavour to keep readers up to date in the various lines of farm machinery that from time to time contain improvements. Last month we were enabled to give particulars of certain machines which Messrs. Malcomess & Co., Ltd., have introduced; this month some points on

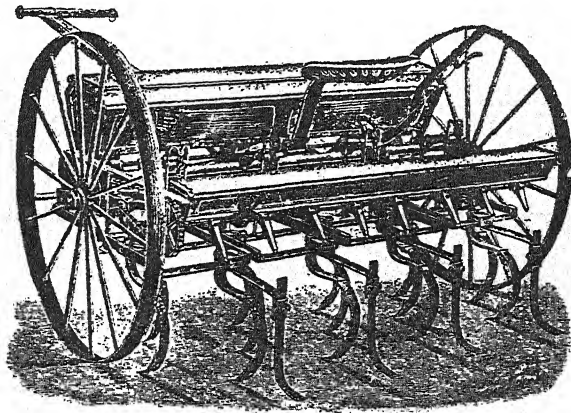


ROTARY LUCERNE CULTIVATOR.

some of the machines which Messrs. G. North & Son, the well-known machinery merchants of Durban, are stocking, may prove of interest to readers.

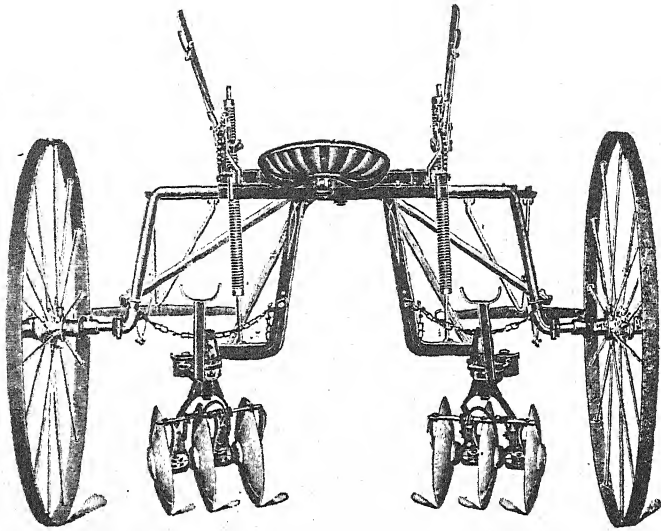
Messrs. G. North & Son carried off the only two first prizes awarded in their section at the recent Durban Show, and are to be congratulated on their success, especially considering the large exhibits and the keen competition they had to contend against.

The first illustration shows the Rotary Lucerne Cultivator specially constructed for Messrs. North & Son. This implement is a great improvement upon the heavier cultivators which depend upon the weight of the digger heads to secure penetration of the teeth, which in soft land frequently dig too deep, while in hard land they scarcely enter the ground. By means of special spring pressure this cultivator can be regulated to dig at a uniform depth regardless of the class of soil. This cultivator is constructed entirely of steel and iron, with the exception of the pole. The wheels are 48 inches high and the cultivator can be worked at a width of 36 inches.



BRANTFORD 13-TOOTH CULTIVATOR.

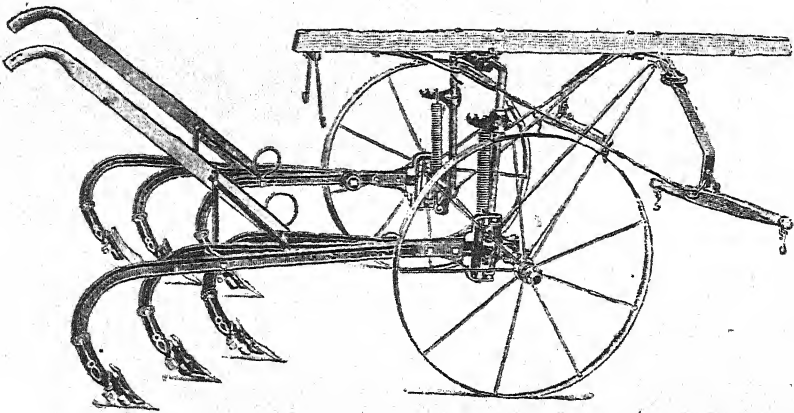
The well-known "Brantford 13-Tooth Cultivator" is depicted in the next illustration with a seeder attachment. The machine can be purchased with or without this attachment, the difference in price being a matter of £6. It is stated that the teeth of the Brantford Cultivator will stand any strain, and that it is impossible to break them with fair usage. This cultivator, which we understand is having a large sale, is highly spoken of, and was awarded first prize in competition against the Martins Cultivator, at a Public Trial held at Bethlehem.



DISC CULTIVATOR.

Our third illustration shows the Disc Cultivator sold by Messrs. North and Son. This cultivator is very strongly constructed, being made entirely of steel and malleable iron. The frame stands 46 inches above ground and the arch is 22 inches wide, which prevents growing crops from being damaged. The bearings are dust-proof. The discs are convertible from in-throw to out-throw, and the frame is adjustable from 48 inches to 76 inches.

The "Adjustable Arch Cultivator" is shown in the last illustration.



ADJUSTABLE ARCH CULTIVATOR.

This cultivator, being made of steel, is very light, and combines strength with durability. The arch, which is in two parts held together with clamps and set screws, can be adjusted in width (expanded or contracted) fully nine inches to accommodate the cultivator to different widths or rows.

An unfortunate transposition of the titles of two of the illustrations occurred, by an error on the part of the printers, in our last month's article. The machine illustrated on page 929 is the "Captain Kidd" Cultivator, and should have appeared on page 932, in place of the larger illustration thereon, which is the Moline Cultivator.

The Land Board.

MONTHLY MEETING.

THE usual monthly meeting of the Land Board was held in the offices of the Department of Agriculture on Tuesday and Wednesday, the 27th and 28th August. Owing to his illness, Mr. James Morton, who has held the position of Chairman since the inception of the Board, has felt compelled to resign his position as Chairman and a member of the Board. A resolution placing on record the Board's deep appreciation of the valuable services rendered by him, not only to the Board but to the Colony in general, was unanimously passed. Mr. G. R. Richards, of Mooi River, has been appointed to fill the vacancy caused by Mr. Morton's resignation and took his seat for the first time on the 27th August. All the other members of the Board, namely, Messrs. Acutt, Arbuthnot, Mullens, and Turner, were present. Mr. Acutt was elected Chairman for the meeting.

Before the Board proceeded to interview applicants, the Minister of Agriculture, the Hon. W. A. Deane, met the Board, and it has been arranged that certain members of the Board shall visit, for the purpose of valuing them, the small farms which have recently been laid off in the vicinity of Winkel Spruit.

Upwards of 28 applicants for land appeared in person before the Board. Of these 19 were passed as suitable applicants, 4 have still to furnish documentary evidence in respect to their capital, while the Board was unable to pass 2 owing to insufficiency of means and lack of practical experience. The remaining applicants were already in possession of land. Documentary evidence was produced by applicants of capital in cash and stock to the amount of £17,500.

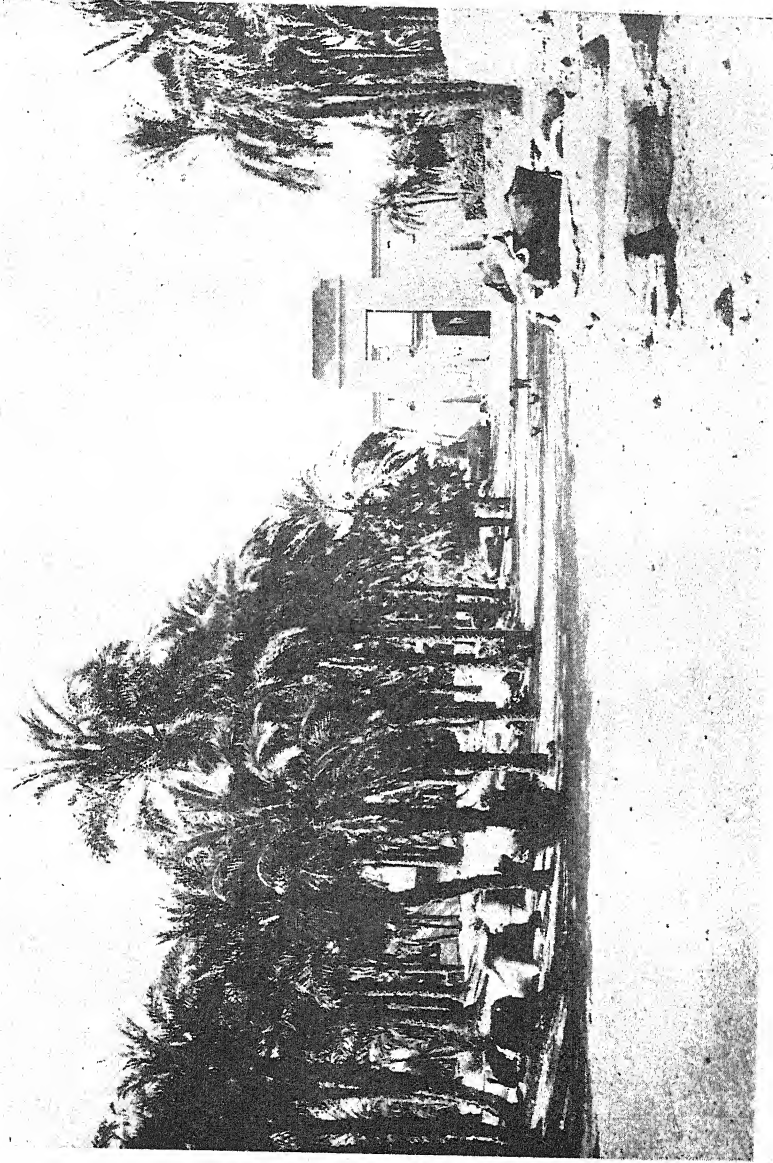
Four applications for advances under the provisions of the Agricultural Development Act, 1904, were laid before the Board. One was approved, and the Board proposes to go personally into the other applications when it visits Winterton in October.

In view of the large number of applications which have been made, and which are still being received for land in the various parts of the Colony, the Board is recommending to the Minister of Agriculture that all Crown Lands for which enquiries have been made should be at once surveyed, beaconed off and valued and that until the applications which have already been received have been finally dealt with no further applications for such lands should be received. The Board is also urging upon the Government the advisability of introducing legislation for the purpose of placing the Rules and Regulations for the disposal of Crown Lands on a permanent basis.

Another meeting of the Board was held on the 25th of September; and on the evening of the following day the Board left for Zululand for the purpose of inspecting the lands which it is proposed to lay off beyond Empangeni. Certain members of the Board have been deputed to revisit the Oribi Flats. In connection with the claims for compensation which have been made by certain allottees as a result of an error in the surveys of several of the Qudeni farms, the Board has signified its willingness to undertake a visit to the district and to arbitrate in the matter. Early in October the Board proposes entering on its annual tour of inspection of the Weenen and Winterton Irrigation Settlements. It is probable that the Board will also visit the farm Varkensfontein, in the vicinity of Colenso.

The holes caused by rust in a watering-can can be stopped with very little trouble. First dry the can thoroughly; then dip a piece of linen or cotton rag in copal varnish and put it over the leaky place inside. When thoroughly hardened, give a coat of paint to the whole can, outside and in.

The demand for Australian butter in London is slowly declining, says a recent issue of the *Agricultural Gazette* (London), as none now arriving can be called strictly "choicest," for which the demand continues good. New Zealand arrivals find a good market, owing to their high quality.



DATE PALMS AT KARNAK.

In the foreground at the right of the picture, and among the palms on the left, may be seen all that is left of one of the famous avenue of sphinxes. The ox on the right, and the chickens, lend a homely air to the scene.

Agricultural Organisation in Cape Colony.

PROGRESS DURING 1906-7.

THE Report of the Cape Superintendent of Agricultural Co-operation (Mr. P. J. Hannon), for the year ended 30th April, 1907, a copy of which has just come to hand, throws much light on the prevailing conditions and the progress which has been made in the direction of the organisation of agriculture in the Old Colony. The Report is, in addition, of particular interest in view of the discussion which took place recently in the Natal Parliament on the question of securing Mr. Hannon's services for a series of lectures in this country on agricultural co-operation.

The progress of agricultural co-operation in the Cape Colony during the year under review was, on the whole, satisfactory; while the principles which underlie schemes of agricultural organisation are more clearly understood. The first branch of Cape agriculture to which the principle of co-operation is being applied most successfully is the wine industry. During the vintage of this year five co-operative wineries were in full operation, constructed on the most modern principles, with reference to the scientific treatment of large volumes of wine by the most up-to-date methods, and dealing in the aggregate with something like 3,000 leaguers of wine. It was especially desirable, if the wine industry of the Colony were to be placed on a competitive basis with a similar article in any other part of the world, that the principle of uniformity and highly developed scientific treatment should be applied to the process of manufacture and subsequent treatment. In Mr. Hannon's opinion the co-operative wineries referred to will not merely compare favourably with the best equipped institutions of a similar character on the Continent of Europe, but are, in many respects, superior; and not the least encouraging part of their working is the intense interest taken by their members in all the processes involved in the making of high-class wine. The criticism may, perhaps, be applied to these wineries, that the expenditure involved is out of proportion to the actual business turnover at present, but, as Mr. Hannon points out, it must be remembered that the wine industry, given favourable conditions and a full measure of organisation, is capable of further vast development, and, therefore, the actual turnover in the early years cannot be taken in any measure as representative of their possible future utility. These wineries are situated at Stellenbosch, Drakenstein, Wellington, Tulbagh, and Montagu. For the vintage of 1908 fifteen further wineries are contemplated, and there seems little doubt, Mr. Hannon thinks, that, if or-

ganisation be vigorously pushed forward many of these will be ready for active work at the close of the present year. This will mean that a large proportion of the total wine production of the Colony will be under the control of an up-to-date organisation, producing wines of their respective types of the highest standard of character. These wineries will farther be federated together through a central committee representative of them all, which will enable them, as a single combination, to take such united effort as may be deemed politic for the protection of their business and the further development of this important national interest. The following table gives some particulars of interest with regard to the wineries now organised:—

Name of Society.	Nominal Capital.	Reserve Capital.	Allotted Capital.	Paid-up Capital.	No. of Members.	Amount of Govt. Advance.	Nature of Security.
The Wellington Co-operative Winery, Ltd.	£ 5,000 (£50 shares)	..	£ 2,500	£ s. 1,250 0	13	£ s. 10,000 0	Mortgage Bond
The Drakenstein Co-operative Winery, Ltd.	15,000 (£1 shares)	..	3,328	166 8	10	8,605 4	"
The Drostdy Co-operative Winery, Ltd.	5,000 (£1 shares)	4,000 shares	1,500	150 0	14	5,000 0	"
Montague Co-operative Wines, Ltd.	10,000 (£1 shares)	..	2,175	156 12	56	3,826 0	"
Farmers' Co-operative Wine Co. (Stellenbosh), Ltd. ..	10,000 (£50 shares)	100 shares	5,300	106 0	12	10,000 0	"

"Notwithstanding what has been achieved," says Mr. Hannon, however, "and more particularly in view of the further operations contemplated, I am bound to call serious attention to the present crisis affecting the wine industry of the Colony. It is a matter for very serious thought whether the organisation of wineries, involving very large outlay by the State in the form of loans, and a very large investment on the part of farmers in the form of share capital, can wisely be proceeded with in view of the existing limitations of our market, unless new possibilities are opened for the disposal of this important product."

THE DAIRYING INDUSTRY.

There were in operation during the whole or portion of the year under review eight co-operative creameries. Their names, capital, and the amount of Government advances made to them are shown in the following table:—

Name of Co-operative Dairy Society.	Nominal Capital.	Reserve Capital.	Allotted Capital.	Paid up Capital.	No. of Members.	Amount of Govt. Advance.	Nature of Security.
Bowker's Park Creamery and Factory, Ltd.	£ 20,000 (£1 shares)	5,000 shares	£ 9,710	£ s 9,710 0	57	£ 5,000	Mortgage Bond
Bedford and Cottesbrook Model Dairy Co., Ltd.	£14,975 (£1 shares)	2,000 m-l allotted in Mar., 1906	£14,975	£12,315 0	..	£4,500	"
The South African Co-operative Dairy Co., Ltd. (Adelaide),	£10,000 (£1 shares)	..	£6,192 12s	£5,572 4/6	122	£8,000	"
Klipheuvcl Farmers' Dairy Co., Ltd.	£3,500 (£1 shares)	500 shares	£1,282	£798 7/10	47	£4,000	"
Wellington Co-operative Dairy Ltd.	£3,500 (£20 shares)	25 "	£1,400	£254 0	50	£4,500	"
The Pokwani Farmers' Co-operative Dairy Society, Ltd. . .	£2,000 (£1 shares)	440 "	£1,560	£110 10	12	£273 7s 8d	"
Western Province Dairy Co., Ltd.	£2,000 (£5 shares)	..	£1,850	£185 0	45	£600	Notarial Bond
Darling Co-operative Creamery, Ltd.	£5,000 (£1 shares)	..	£4,175	£1,043 15	48	£3,500	Mortgage Bond

The main obstacles, it is stated, which have to be overcome in the spread of the dairying industry in the Cape Colony are:—

1. The farmer must be brought to understand that in many districts dairying is not merely an incidental but an essential part of his farming.
2. The much greater care necessary in the selection, breeding and general treatment of milch cows.
3. Raising sufficient foodstuffs for the use of milch cows during the scarce period of the South African seasons.
4. Greater attention to general cleanliness in the kraal, the cow, the milker and the vessels.
5. Proper standing and cooling arrangements for milk and cream.
6. More systematic delivery of cream to creameries and collecting centres.
7. The recognition of the fact that abnormally high prices for colonial butter can no longer be maintained, and that the producer to-day, in this Colony, has his limits to price necessarily determined by the landed value of imported butter.
8. The unfortunate tendency, now happily no longer persisted in, on the part of the creameries to keep up large supplies of butter in cold storage from one part of the year to another.

There is no doubt, Mr. Hannon thinks, that, with the spread of education and more enlightened methods of farming generally, most of

these obstacles will be successfully surmounted; and probably in time dairying will come to be regarded, in certain districts at all events, as occupying the same eminent position in Cape agriculture as is the case in the Australian States. "But at the present moment the creamery industry oscillates with much too great a range between a feast and a famine."

The difficulties affecting the organisation of the dairying industry in the Colony have, it is stated, been more serious and irritating than could have been anticipated. In some instances there was much inconvenience caused through the want of really competent creamery managers in the country, and committees were necessarily obliged to accept such men as they were able, at the early stages of their operations, to secure. Moreover, skilled hands capable of taking charge of machinery were not always available, and this naturally impaired the efficient and economical working of the plant. Account-keeping has occasionally been defective; and the preparation of monthly returns of purchases, sales and working expenditure, for the information of the Government, has not infrequently been unsatisfactory, and in a few cases almost wholly neglected. Troubles also arose through the mistaken policy of a few creameries in the accumulation of large quantities of butter in the "flush" season, with a view to a rising market during periods of scarcity. Marked improvement has, however, been effected in the various matters indicated, and every creamery may now be said to be managed and maintained on business principles, having regard to its local conditions and the exigencies of its district. "The managers in charge are hard-working and earnest, accounts and returns have little to be found fault with, committees are giving constant evidence of more energetic supervision and are thoroughly alive to their responsibilities, fidelity guarantees and insurance policies are all in order, the cold storage of quantities of butter has been definitely abandoned, and wherever defective management has supervened there are genuine and successful efforts being made to recover lost ground and establish confidence."

There is, of course, still, and must be for some time, Mr. Hannon points out, the drawback incidental to irregularity of cream supply, and consequently at certain parts of the season working expenses will bear an abnormally high ratio to turnover; but here, as elsewhere, the spread of knowledge of dairying on a scientific basis, and the gradual appreciation of the profits accruing from this branch of farming, will steadily bring about increase and uniformity in the quantity of milk and cream delivered at the creameries.

There were in existence in Cape Colony on the 30th April, 1907, 53 co-operative association of various kinds, made up as follows:—

Wineries	5
Creameries	7
Milk Pasteuring Stations	1

Cheese Factories	1
Syndicates	9
Cold Storage	1
Fruit Preserving	1
Fruit Drying and Export	4
Produce Agencies	2
Wool Associations	22

There were, in addition, 56 societies and syndicates in process of formation, besides 31 schemes not fully considered.

We hope to return to this subject in our next issue, as the experience which is being gained in Cape Colony will of a certainty be found of value to those in Natal who are interested in the organisation of our agriculture. As Mr. Hannon points out, in all new movements, and especially in those affecting agriculture, valuable ideas may be derived from the experience of other countries; but those ideas may do more harm than good if their wholesale introduction were to be advocated in South Africa without careful regard to, and very thoughtful study of, the peculiarities of our soil, climate, and economic conditions.

In concluding the present article, it may be interesting to quote Mr. Hannon's summary of the principal points to be borne in mind by the advocates of co-operative enterprise, as, if such fundamental considerations are kept in view in this country, the work of agricultural organisation will run much more smoothly and satisfactorily. These are that:—

1. The creation of successful industrial enterprise is a process of somewhat slow growth, and involves the constant and serious application of elementary business principles to the details of the undertaking; and not unfrequently necessitates personal and collective sacrifice on the part of its promoters in its earlier stages.

2. Mutual trust and confidence, and respect for one another's prejudices and points of view must constantly pervade the minds of those associated together.

3. The scheme proposed must be treated from its most difficult aspect, and every possibility of failure must be examined with due regard to the best means by which it may be surmounted.

4. The individual member of the society or syndicate must regard his share in its operations with the same sense of responsibility as if he were dealing with a scheme of improvement upon his own property.

5. Every scheme must be thought out as a purely business proposal, and all considerations apart from its strictly commercial aspect must be eliminated.

6. Before seeking State aid local enterprise should be exploited to the uttermost, and financial support sought should be regarded as supplementary to fully developed local effort.

Land Board.

ANNUAL REPORT, 1906-7.

THE following annual report of the Land Board has been submitted to the Minister of Agriculture by the Chairman of the Board:—

Hon. Minister of Agriculture.

Sir,—I have the honour to present to you the Second Annual Report of the Land Board appointed under Section 5 of the Agricultural Development Act, 1904.

2. During the year 12 sittings of the Board were held and official inspection of the Weenen and Winterton Irrigation Settlements, in addition to one inspection and report made by an individual member thereof.

3. The following is a table of the attendances at the meetings, etc., of the Board held during the year:—

	Possible No. of Attendances.	Actual No. of Attendances.
Mr. Morton (Chairman)	13	13
Mr. Acutt	13	9
Mr. Arbuthnot	2	2
Mr. Mullens	13	12
Mr. Turner	2	2
Mr. Kirkman	9	3
Mr. Moor	9	6

4. Owing to Mr. Kirkman and Mr. Moor having been elected members of the Legislative Assembly, they had to tender their resignations, and Messrs. St. George Arbuthnot and E. J. Turner were appointed by the Governor in Council for the unexpired periods of Messrs. Kirkman's and Moor's appointments.

5. Mr. Acutt retired on the 30th June, 1906, in accordance with Section 9 of the Act, and was re-appointed by the Governor in Council for another period of three years.

ZULULAND LANDS.

6. The Board has continued to select and advise upon applicants for the lands in Zululand thrown upon for European selection. These lands, however, have not been placed by the Government under the Agricultural Development Act, and the Board has not been asked to advise in regard to their occupation or development. It has not been in any way associated with the Zululand lands beyond that of being asked to select and advise upon applicants for the same for the approval of the Minister.

7. One hundred and one applicants for the Zululand lands were

examined by the Board during the year, and 93 were recommended to the Minister as suitable, representing approximately 55,000 acres of land.

NONOTI LANDS.

8. The Nonoti lands referred to in the Board's previous report have not been offered to the public on account of East Coast Fever having appeared in the district and the lands in question being infected. The Board considers it impracticable to deal with these lands until the East Coast Fever disappears from the district.

VARKENSFONTEIN.

9. No action has been taken in connection with this farm, which was acquired prior to the creation of the Board in connection with a contemplated irrigation scheme. Pending the consideration of the scheme in question, the Board deems it inadvisable to throw this farm open for settlement.

OVERSEA IMMIGRANTS.

10. The Board regrets to have to report that practically no oversea immigrants have come to its settlements in response to the advertisements and circulars issued in Great Britain.

RIGHT OF CONVERSION.

11. The Board has again urged upon you and upon the Government the necessity for giving settlers under the Agricultural Development Act the right of conversion to freehold after a reasonable period has elapsed. Many suitable settlers have been deterred from taking up land at Winterton on account of the leasehold system, and the Board considers that it will be to the interests of the Colony to hold out the inducement of freehold to intending settlers.

AGRICULTURAL CREDIT BANKS.

12. The Board still recommends that the Agricultural Development Act be amended so as to give the Board power to assist in the formation of Agricultural Credit Banks.

UNALIENATED CROWN LANDS.

13. The position of the Board as regards the unalienated Crown Lands of the Colony is still undefined.

WEENEN SETTLEMENT.

14. The Board has found itself unable to assist the Weenen settlers in the development of their lands owing to the fact that Section 47 of the Agricultural Development Act of 1904 limits advances to settlers upon improvements *to the first three years* of their occupation. The Board has, therefore, recommended to the Government that the words "within the first three years of his occupation of an allotment" be deleted from the section in question.

15. In accordance with the advice given by the Board, the cultivation of lucerne has been taken up by the settlers at Weenen, but the Board regrets to have to report that sufficient care has not been exercised by some of the settlers, with the result that trouble has arisen through the presence of weeds and grasses amongst the lucerne marketed.

16. The instalments on these lands are still greatly in arrear. The Board has brought what pressure it can to bear upon the settlers to clear off those arrears, and has given every consideration possible in view of the difficulties the settlers have had to contend with in the past.

17. A storm of an exceptionally bad character swept over Weenen in February, 1906, and washed away a portion of the retaining wall. This was, however, promptly repaired and strengthened, a vote of £250 being granted by the Government for the purpose from capital account.

18. The formation of an Advisory Committee, consisting of five resident settlers on the Weenen Upper Settlement, was authorised by the Board to advise and uphold the Channel Keeper in the execution of his duties in connection with the regulation and distribution of water from the Weenen High Level Furrow and to assist in the economical and efficient working of the Upper Settlement.

WINTERTON.

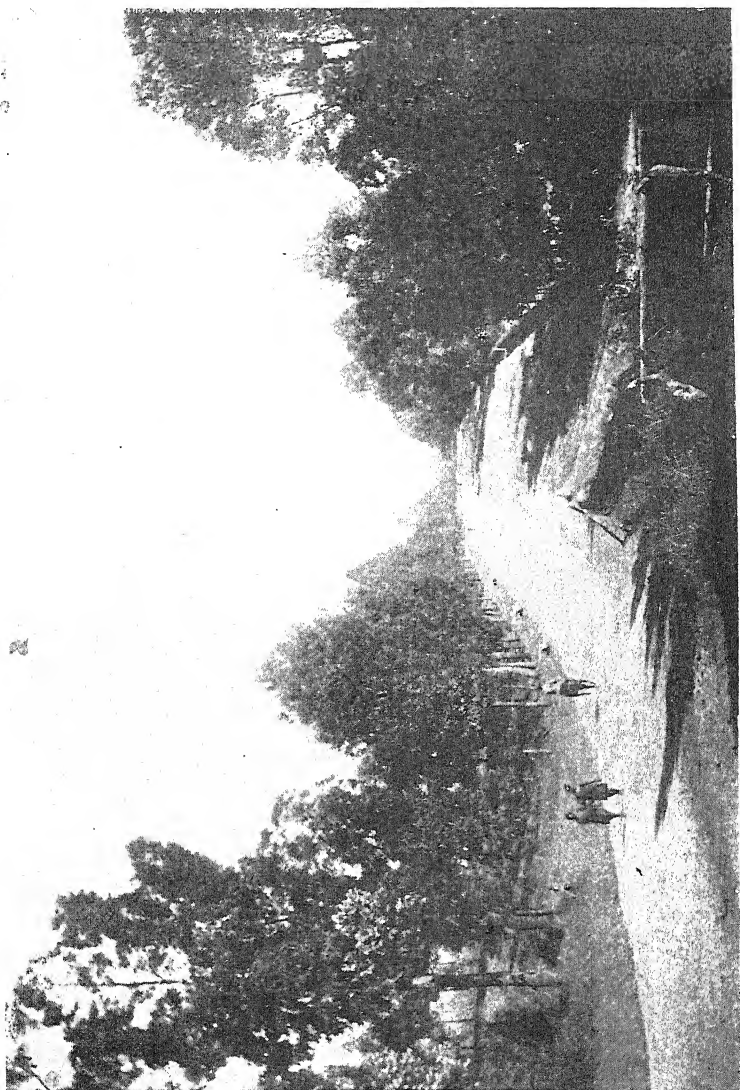
19. As a consequence of the Native Rebellion, all the young settlers at Winterton had to take the field, thereby seriously interfering with their farming operations.

20. Seven applications for financial assistance under Section 48 of the Agricultural Development Act, 1904, were granted by the Board during the year. One application was refused.

21. Twenty-eight applications were made to the Board for allotments, and twenty-one were passed, five of whom, however, subsequently withdrew their applications. The number of settlers at Winterton on the 31st December, 1906, was 33, including two lady settlers, Miss Hewetson and Miss Puzey.

22. The Separating Station constructed at Winterton under the authority of the Act has not proved the success the Board anticipated. The Board has consistently urged that dairying is the most suitable form of farming for this settlement, and is confident that if the settlers take up this industry it will prove remunerative. Owing, however, to various causes, the settlers have not yet found themselves in a position to go in for dairying. The Board had under consideration the advisability of advancing money to the settlers for the purpose of buying dairy stock, but, in view of the outbreak of East Coast Fever within the Colony, decided to leave the matter in abeyance until it could more clearly be seen what the effect of the disease would be.

23. Sod huts have been erected at the Winterton Settlement. These



AN AVENUE OF TREES IN ESHOWE.
(Photo by Mr. J. J. Stephenson, Dept. of Agriculture.)

consist of three rooms, and are let to settlers at a monthly rental of 5s., payable until the capital cost, with interest, has been paid off.

24. A site, embracing five acres, for a school at Winterton, has been granted by the Board in the vicinity of the Railway Station, and the educational facilities thereby established will, the Board trusts, prove of considerable benefit to the district.

RAILWAY COMMUNICATION.

25. The construction of branch lines to the Weenen and Winterton Settlements was commenced during the year. The railway to Weenen is of narrow gauge starting at Estcourt, and that to Winterton is of ordinary gauge, branching off at Ennersdale. Both lines were well in hand before the close of the year with every prospect of being shortly completed.

CO-OPERATIVE ASSOCIATIONS.

26. No financial assistance to Co-operative Associations was formally applied for during the year, although correspondence and interviews had taken place between the Board and one or two applicants as to the terms upon which such assistance would be granted.

27. The Board has laid down the following conditions to be complied with before it will be prepared to recommend any loan to the Government:—

- (a) That the Society adopts the rules for Co-operative Societies which have been approved by the Land Board.
- (b) That the Board reserves to itself the right to be entitled to delegate any member of the Board or any Government official to be present at any meeting of the Society or Board of Directors, and such member of the Board or Government official to be entitled to all the privileges of an ordinary shareholder—except the right of voting—and to enquire at any time into the financial position, and work of the Society.
- (c) That the Land Board reserves to itself the right to call upon the Society at any time to submit statements showing the nature and transactions of the Society and setting forth in detail its financial position.
- (d) That any Specialist of the Government shall have the right, at any reasonable time, to enter upon the premises of the Society and enquire into its management and work.
- (e) That the loan can only be advanced on the condition that it is used solely for the purpose for which application was made, and for no other purpose whatsoever; any breach of this condition constituting a serious offence.

28. Rules for Co-operative Societies, based upon those issued by the

British Agricultural Organization Society, were framed and issued during the year. They are sold by the Stationery Storekeeper, Colonial Offices, at the rate of 1s. a copy.

RAILWAY PASSES.

29. The free railway passes placed at the disposal of the members of the Board in previous years were withdrawn last year and orders for tickets have since been issued by the Secretary for journeys undertaken by the members.

I have, etc.,

JAMES MORTON,
Chairman, Land Board.

Preparation of Wool for Market.

THE Home Wool Buyers' Association, England, have issued the following suggestions to wool growers on the preparation of wools for the market.

Washing.—Sheep to be carefully washed, and clipped within 10 or 12 days after washing, otherwise the wool cannot fairly be sold as washed. Sheep should be properly dagged before washing, as the manure not only discolours the water but damages the fleece.

Clipped when Dry.—Sheep to be thoroughly dry before being clipped, as wool clipped in a damp state quickly deteriorates in appearance and value.

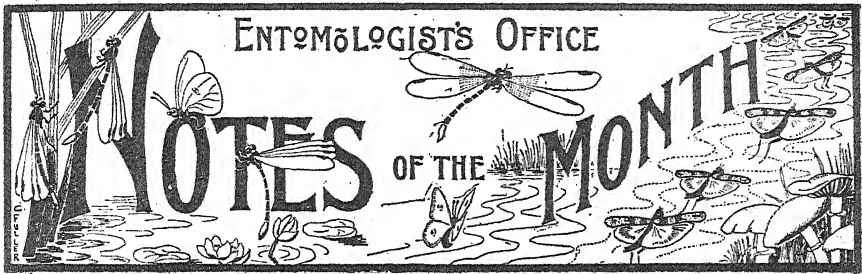
Clipping Yard.—The yard or shed where clipping takes place to be kept as clean as possible. Every care should be used to keep the wool free from grass, straw or vegetable matter.

Winding Wool.—The fleece to be neatly wound (no string or twine should be used). All daggings to be taken off. Locks and broken wool to be packed separately.

Dip.—No dip which discolours the wool should be used.

Branding.—The sheep should be branded in such a manner that little of the marking remains when fleece is clipped. All parts affected by tar and composition have to be clipped off before the wool can be used, these being of little value. The Association recommends all sheep to be marked with a mixture that is soluble in hot water, and whenever possible on the head.

Storing.—It is very important that wool should be stored in a dry place, and kept as clean as possible. No grain should be near the wool as it is often carried into the pile by vermin,



Locusts in August.

EARLY in the month the swarms of flying locusts, which have been hibernating in the Colony and more or less confined to certain districts, began to evince a restless disposition and to make minor migrations. The tendency of flight was towards no particular point of the compass, and, as formerly noticed, the swarms remained in the middle belt. In the Ngotshe Division swarms had been resident in the low country, but just at the end of July these entered Zululand. What caused this departure cannot be stated, unless it was extensive grass burning. During the last few days of the month this district was invaded from Swaziland.

The restlessness of the swarms was clearly indicated in the reports reaching this office by the fact that fliers were frequently reported from places and even districts in which they had been absent for several months. That this feature was not confined to the locusts in Natal alone became manifest during the last week of the month, when from Paulpietersburg, Vryheid, Babanango, Greytown and New Hanover reports of locusts flying S.E. came to hand frequently. This indicated that invasion was taking place from the direction of Swaziland, as all those neighbourhoods had remained free of locusts for some time. Enquiries addressed to the Central Locust Bureau resulted in information being furnished which goes to establish the fact that a large flight has occurred from the direction indicated. This invasion, at the time of writing, is not a grave one excepting that it adds to the number of swarms in the Colony. If, however, more locusts enter the Colony, there is certainly reason for anticipating a troublesome locust season, because there have been more swarms wintering in Natal than during any former winter of which the writer has cognizance.

At the time of writing, the immediate vicinity of the coast from the Tugela downwards remains remarkably free of flying locusts, but will no doubt be invaded in September or October,

PEACH-LEAF CURL.

Several complaints regarding this fungus trouble have been made during the month, the disease being already manifest in the young leaves of the early peaches. Peach-leaf Curl is due to a fungus parasite and is a disease capable of doing great injury to peaches. It has only been in evidence during recent years and seems to be more noticeable each year. Whilst the leaves show the effect the most, the young shoots and fruit are also attacked. The leaves become thickened and assume a crumpled appearance owing to the damage done to the cells by the fungus, and the shoots also become swollen and distorted. When affected, the fruit is blotched and blistered and often falls before ripening.

The proper treatment of this disease is winter spraying with Bordeaux Mixture one or two weeks before the opening of the blossoms, *i.e.*, as a general rule, early in August. Such spraying needs to be repeated each season so as to keep the parasite under control. For winter spraying the mixture should be prepared from 6 lbs. quicklime, 6 lbs. copper sulphate (best), and 45 gallons of water. These proportions must never be used for spraying peaches, plums or nectarines when in foliage as the chemical action burns the leaves. When sprayed on peaches in leaf the mixture should not be stronger than 2 lbs. of copper sulphate and 2 lbs. of quicklime to 50 gallons of water. At this strength a little burning will occur but the damage is immaterial.



WHITE ANTS ON FRUIT TREES.

Replying to a correspondent who asked for a remedy for the attacks of white ants on fruit trees, the Entomological Department of Western Australia recommended Quibell's mixture, applied at the rate of one part of the mixture to 15 parts of water (less if the tree be tender), as one of the simplest methods of treating the pest. The soil should be earthed up around the stem, to about four inches, and formed into a basin or hollow on top. Into this is poured a small quantity of the mixture—say, a small bucketful to a dozen tins, or less if the trees be naturally tender. When this has soaked into the ground, the soil in which the mixture has been placed should be covered up.

Another simple remedy is the usual poison bait used for cutworms, which is made up of the following:—1 oz. Paris green, 3 lb. of flour, and 3 oz. of sugar mixed into a stiff dough and placed in holes near the stem of the attached trees and covered with a shingle or any flat substance to exclude the light. The insects eat this mixture and die, and are eaten by their fellow insects, who are also poisoned and die.

INSECTICIDES.

PARAFFIN EMULSION.

(For Scale-Insects and Aphides.)

Caution.—In spraying with oily washes, make the application just sufficient to wet the plant. Do not let the liquid collect about the base of the tree. Earth up before spraying, and remove damp soil within two hours afterwards.

Formulae.

Good hard soap.—2 pounds, or 8 ounces.

Or Soft Soap.—4 pounds, or 1 pound.

Paraffin.—4 gallons, or 1 gallon.

Water (rain).—2 gallons, or 4 pints.

Chop up soap, boil till dissolved, immediately, remove from fire and add paraffin. Churn at once by pumping liquid back upon itself for 5 to 10 minutes with the spray-pump. Dilute for use with water.

Advice.

For application to hardy plants dilute with 7 to 9 volumes of water, for tender plants and sappy growth dilute with 15 volumes of water. Use soft water. The stock emulsion will keep indefinitely if made with soft water; if not, the oil will separate.

PARAFFIN-MILK EMULSION.

(A Substitute for the Foregoing.)

Paraffin.—2 gallons.

Sour milk.—1 gallon.

Pour together, and churn with spray-pump. If a thick butter does not form after five minutes, add a little vinegar. Dilute with water for use.

Advice.

For tender plants dilute with 15 to 20 volumes of water; for hardy plants dilute with 7 to 9 volumes of water. As this emulsion ferments it must be used immediately. It is preferably adopted for making up small quantities.

RESIN WASH.

(For Scale-Insects generally in Winter and Dry Weather.)

Resin (ground).—24 pounds.

Caustic Soda (98 per cent.)—5 pounds.

Fish Oil (not cooking Oil).—3 pints.

Water, for final bulk.—100 gallons.

Boil ingredients in 15 gallons of water, using a 20-gallon kafir pot, for two to three hours. If any tendency to boil over add a couple of pints of hot water. Strain and dilute to 100 galls. with cold water. If not obtainable the fish oil may be omitted.

Advice.

Never add cold water to cooking mixture. The stock solution will keep, but the wash is best used as soon as made. An hour's boiling gives a mixture which may be used, but it will not prove as good as one thoroughly cooked.

If any sediment forms, cook up again.

TOBACCO WASH.

(For *Aphides, etc., on tender plants.*)

Tobacco (stems or dust).—1 pound.

Soap.—1 ounce.

Water.—3 gallons.

Boil tobacco thoroughly in 1 gall. water. Strain infusion and dissolve soap in it. Dilute for use to 3 gallons. Nicotine sheep dip (Lion Brand) diluted 1 to 70 is a good substitute.

LIME-SULPHUR-SALT WASH.

(For *Scale-Insects, Lichens and Fungi.*)

Caution.—This wash is only to be used upon deciduous trees when out of leaf and fully dormant. Copper tanks and pumps are destroyed by it. It is caustic, rubber gloves should be used by operators and animals in spray-cart should be blanketed.

Stone Lime (unslaked).—20 pounds.

Sulphur.—10 pounds.

Salt.—3 pounds.

Water.—30 gallons.

Take a 20-gallon kafir pot, pour in 4 galls. hot water, add 10 lbs. sulphur and mix in lime quickly, adding boiling water to bring mass to a thick paste. Work mass to a homogeneous paste, add water to bring to 10 galls. Add 3 lbs. salt and boil for 40 minutes. When cooked strain and dilute to 30 gallons.

Advice.

Use only unslaked lime, imported for preference. Use hot water when adding to cooking mixture to save time. Have a stout paddle for stirring. In making a larger quantity use several pots. In diluting pour wash *into* required amount of water. Always strain wash thoroughly and cleanse pumps and nozzles before putting away.

LIME-BISULPHIDE WASH.

(For *Red Spider and as a substitute for Lime-Sulphur-Salt Wash.*)

Stone Lime (unslaked).—5 pounds.

Flowers of Sulphur.—5 pounds.

Water.—4 gallons.

Boil ingredients in a kafir pot until a brownish liquid is formed. Dilute to 100 gallons for use.

SODA-SULPHUR SPRAY.

(For Red Spider and other Plant Mites.)

Caustic Soda (98 per cent.)—10 pounds.

Flowers of Sulphur.—20 pounds.

Water.—20 gallons.

Mix sulphur to a wet but not sloppy paste, in a wooden tub or barrel. Add to paste 10 lbs. caustic soda. As it boils add gradually the 20 galls. water, but do not add sufficient at a time to stop boiling. Take 1 part to 50 of water for use.

Inter-Colonial Agricultural Congress.

On Monday, September 30th, at 10 a.m., will be opened the Third Annual Congress of the Inter-Colonial Agricultural Union of South Africa at the Town Hall, Pretoria.

According to the agenda paper, a considerable amount of important business will come before the delegates, matters connected with stock diseases, etc., railway questions, agricultural shows (judging and special prizes), agricultural education, ocean freights on live stock, exportation of ostriches and their eggs, purchase of land by natives, locust destruction, irrigation, noxious weeds, plant diseases, cost of farm labour and its regulation, and uniform weights and measures for produce, being the principal subjects to receive consideration. The text of the motions to be brought forward has not been published. Those from Natal will, however, include the following:—"This Congress is of opinion that the high rates of ocean freights on live stock seriously hinders the growth of the stock industry in South Africa, and therefore urges the Governments of the various Colonies to take the subject into consideration with a view to bringing pressure to bear on the Shipping Conference to reduce the rates on pedigree stock to a reasonable level." Our delegates have also instructions to reaffirm the resolutions passed and not so far acceded to by the Governments, particularly those resolutions dealing with the eradication of stock diseases and the uniformity of weights and measures.

Natal will be represented by the following gentlemen:—Rev. Jas. Scott, Col. Friend Addison, Messrs. E. W. Evans, G. D. Alexander, F. A. R. Johnstone, Dukes, G. L. Coventry, J. Moon, C. H. Mitchell, D. C. Dick, D. C. Aitken, W. Craig, J. Marwick, C. E. Hancock, J. M. van Rooyen, H. Wiltshire and Jas. King. The Rev. Jas. Scott and Mr. G. D. Alexander are among the Vice-Presidents of the Inter-Colonial Union.

It is hoped to publish a report of the proceedings of the Congress in the next issue of the *Journal*.

Parliamentary Notes and Notions.

By "SCRUTATOR."

Maritzburg,

23rd September, 1907.

A STEADY grind through the various business that has come up for consideration has been the order of things in Parliament during the past month—broken only once, by the introduction by Mr. Evans of his "No confidence" motion, and the debate thereon. The Supply Bill was finally disposed of by the Assembly early in the month; and after having been subjected to much criticism—the burden of which was that the amount of money spent by the State in the administration of this country was far too large—in the Council, is now practically through the Upper House.

Agricultural Legislation.

A considerable amount of work has, since the commencement of the session, been accomplished in the consideration and passage of Bills affecting the farming population; and it may be of interest at this stage to give a brief resume of what has actually been done in this direction.

Twelve Bills in all, of direct interest to the farmer, have come before Parliament. Seven of these have passed through both Houses, viz., East Coast Fever Act Amendent Bill (now Act No. 8, 1907), East Coast Fever Fencing Bill (now Act No. 6, 1907), East Coast Fever Loan Act Amendment Bill (now Act No. 7, 1907), Lungsiickness Prevention Act Amendment Bill (now Act No. 15, 1907), Tuberculosis Prevention Act Amendment Bill (now Act No. 14, 1907), Export of Ostriches and Ostrich Eggs Protection Bill, and Purchase of Cattle Appropriation Bill. Of the remaining five, the Loan and Agricultural Loan Fund Bill and the Agricultural Development Act Amendment Bill have both passed through the Assembly and are now being considered by the Council; the Mange Bill, which passed through the Assembly, was thrown out by the Council; and the Land Tax Bill and the Land Tax Assessment Bill have both passed their second reading in the Lower House.

S.A. Commercial Agency.

By means of a question in the House, Mr. Clayton elicited the views of Government "in reference to a suggested conference of the South African Colonies for the purpose of establishing a general agency in London for the promotion of business in South African produce," and he also asked



RYE OF ABRUZZAS
Central Experiment Farm, Cedara.

whether the Government proposed placing a sum on the Estimates by way of contribution towards such agency. The Prime Minister, in reply, said that the matter had already been fully considered in consultation with the other South African Colonies, who, with Natal, had decided that they were not prepared at the present time to contribute towards the cost of such an agency. It is unfortunate that the finances of this and other South African Colonies will not permit of the institution of a commercial agency in London, for it is now, of all times, that such an agency is wanted. The Agents General, however, will be able to do much to safeguard and push South African interests, and it is probable that the Administrations concerned have this fact in mind.

Mr. Pearson's Report.

Mr. Clayton's motion in favour of the early printing of the report of Mr. Pearson, the late Director of Agricultural Experiments and Chemistry, was carried by the House. In moving, the hon. member recounted the steps which have been taken during the last five or six years by this Colony in the adoption of the principle of scientific experiments in agriculture. A start, he said, was made at Cedara, where a great deal of good work had been done. Another farm was opened up later at Winkel Spruit, and there an increasingly large amount of work had been done. Still later Weenen was opened up; and it was desirable that the results of all this work should be made public. Farmers should not be allowed to work in the dark, and the publication of the results of the experiments as suggested would be the best possible means of assisting the farmer. Mr. Deane replied that the reason the report had not been printed was on account of the expense involved.

Freehold versus Leasehold.

On the occasion of the second reading of the Agricultural Development Act Amendment Bill, a long discussion took place on the question of the advisability of allowing settlers at Winterton to convert their land from leasehold into freehold. To enable them to do so was, the Minister of Agriculture explained, the object of the Bill; and he was quite satisfied that if the amendment proposed was accepted by the House, it would be the means of creating a greater demand for the Winterton lands. Mr. Kirkman—who, it may be remembered, was formerly a member of the Land Board—expressed himself as against the principle involved in the proposed amendment. He was not satisfied that the Government would be safe in giving up the freehold of the land in question, as in his opinion it would simply mean that they would be under the thumb of the settlers, who might convert their leaseholds into freeholds.

Messrs. Hyslop, Evans and McLarty also opposed the Bill; but Mr. J. Moor—also a late member of the Land Board—expressed himself as strongly in favour of the principle of the Bill, arguing on the same lines as the Minister of Agriculture. The Prime Minister pointed out that the House had accepted the principle of conversion of leasehold to freehold. If the land at Winterton was converted into freehold Government could control the water supply in the same way as corporations in the Colony did in regard to household supplies. It was desirable that the lands now lying idle at Winterton should be taken up, and the first step to attain that end, he considered, was to permit of its conversion into freehold.

Agricultural Credit.

The Land and Agricultural Loan Fund Bill elicited some comments of a rather conservative nature during its passage through the Legislative Council. The principles of agricultural credit do not seem to be fully understood by many; and some even think the institution of a Land Bank will bring about competition with the ordinary commercial. As a matter of fact, it is almost invariably found, in practice, that these agricultural or land banks never come in competition with the commercial banks, and often the latter even welcome the advent of the former. Those interested in the subject of agricultural credit are strongly recommended to invest in a copy of Henry Wolff's book, "Agricultural Banks," published by King and Son. Mr. Wolff has recently written another book which will also be found of much interest, viz., "Co-operative Banking." These books should be of particular interest to presidents and secretaries of agricultural associations; and they are also recommended to the attention of those who are endeavouring to relieve distress among farmers in the Northern Districts.

Land Tax.

The longest debate, or series of debates, that has taken place in the House during the month, was on the occasion of the second reading of the Land Tax Assessment Bill. In moving the second reading, the Treasurer explained the reasons which had led the Government to introduce a tax on land values. The measure, he continued, was not only necessary from a revenue-collecting point of view, but it was also necessary inasmuch as it would tend to throw unoccupied lands into the open market. It would be necessary, he added, for the Government to take steps to prevent the native being made to bear the burden of the tax; and when the Native Commission's Report should come to be dealt with and legislation was framed thereon, it would be the Government's duty to protect the native from the rapacity of the so-called "Kafir farmer."

Mr. Smythe spoke at some length against the institution of the proposed tax, using the same line of argument as that adopted by the various meetings which have taken place in various parts of the country protesting against the measure. Was it fair, he asked, to tax occupied land as well as unoccupied land? To his mind it was not. Why should the unfortunate man who had chosen to make his living at farming be specially taxed when he was doing his best to produce wealth to the State? He was in favour of taxing land that was not beneficially used, but to tax land where every effort was being made to make the best use of it, was "manifestly unfair." He proceeded to show that the tax, if introduced, would probably mean nothing more or less than an income tax of something like 3s. 4d. in the pound. Mr. Watt next spoke, followed by Mr. Winter—both against the measure. Mr. Oliff, in the course of his remarks, admitted that the proposed land tax would affect the rural districts, but he pointed out that it would also touch the absentee landlords and Kafir farmers. He had every sympathy with the poor, struggling farmer, but none with the absentee land-owner who was benefitting from the lands in the Colony without there being a corresponding benefit to the finances of the Colony. He showed that if the land tax was going to affect the farmers, the Treasurer was seeking to impose a stamp tax which would be felt most strongly by the townspeople. A great deal of suffering in the towns was due to the fact that working men had invested in a home in order to save rent, but owing to the depression and reduction of wages they were now in difficulties. There was a great deal of distress in the towns, and it was felt more acutely than by the farming community. He considered that the farming community and the people in the towns should be taxed in equal measure; and with that idea he supported the Bill.

Mr. Hyslop, speaking against the Bill, said that the principle of the taxation brought forward was unsound and unequal in its incidence. No one has more consistently advocated the taxation of absentee landlords or unoccupied lands than himself. But he could not agree with a tax on land beneficially occupied. It was an unsound principle to adopt such a tax. The man who produces from the land as desired by the Prime Minister would be taxed and yet the investor would escape free.

Mr. Clayton's argument was practically the same; and he suggested that a much heavier tax be levied on unoccupied lands and a corresponding reduction made on beneficially occupied lands.

The Prime Minister next spoke, and in the course of a long speech said he felt that in the past the farmers had escaped, to a large extent, the burdens of taxation, and they had been enjoying large contributions

from the public revenue without paying that direct taxation which in other countries fell on the landowners. He wished the farmers to show the Colony that they were not the tyrants those in the towns took them to be. They had had the assistance of the towns in many directions, and he gratefully acknowledged it. They asked the towns to stand by them when plagues were disseminated amongst the flocks and herds. This session hundreds and thousands had been willingly voted by those representing the towns to meet these troubles, and it was idle to deny that they had had their roads paid for out of the general revenue, whereas in other countries they had local revenue to pay for the roads.

He said he did not want to draw odious comparisons between the farmer and the townsman, but the farmer had had a distinct advantage over the townsman. With the assistance of those representing the towns who were not going to benefit, a land bank was being established to help the farmers to produce from their land. He did not think the amount the farmers were asked to pay in respect to the tax before the House was so outrageous as had been represented. The third class cottage in town was probably paying double as much in rates to the Corporation, and they ought to be ashamed to make out that this was a heavy tax. He also pointed out that the Colony had spent large sums in the past in building those branch railways which to-day had enhanced the value of the land a hundred-fold, and the lands through which these railways passed had been benefited by that amount without asking the landowners to contribute at all to that public development.

On a division, the motion for the second reading of the Bill was carried, by 23 ayes against 7 noes. Besides the Prime Minister, Minister of Agriculture, Colonial Secretary, Minister of Justice, and the Treasurer, Messrs. Evans, McLarty, Armstrong, O'Meara, Oliff, Emmett, Tol Nel, Bosman, Farquhar, Morcom, Haggard, Palmer, Walker, Taylor, Theu. Nel, Fergg, Clayton and Churchill voted in favour of the Bill; and Messrs. J. Mocer, Winter, Myburg, Smythe, Watt, Kirkman and Schofield against. Messrs Hitchins and Hyslop paired.

According to the *Californian Fruit Grower*, a factory for the manufacture of banana flour, banana coffee, a preparation from cocoanut and many vegetables put up in a new form in the dried state, will soon be in operation at Texas City, U.S.A.

Camperdown Agricultural Society.

ANNUAL MEETING AND REPORT.

THE Annual Meeting of the Camperdown Agricultural Society was held on Friday, September 13th, with Mr. John Moon, the President of the Society, in the chair. The reading of the minutes of the previous annual meeting having been read, the President read his report, of which we have been favoured with a copy. Mr. Moon said:—

“Gentlemen,—This is our Third Annual Meeting. I am pleased to say we had a splendid Show, more especially in produce. Mealies, I think, were a record both in quantity and quality, and everything passed off as nicely as possible. Now, some people say ‘Small Shows’ should be done away with, and that there should be one Central Show. Well, I cannot quite agree with this, more especially since we have held Shows at Camperdown, as I am beginning to see it is an education. Farmers in this district who never used to show have come forward and exhibited their produce both in Maritzburg and Durban, and this has brought them out. I think it will make better farmers of them, as with the quality of produce now put on shows, exhibits must be first class, and this makes the young men more careful in their farming all round. If only for these reasons small shows will do good. When I say ‘Small Shows’ I do not consider Camperdown Shows small, and if this Society is well managed, in time to come there will not be many larger shows in Natal.

“As you all know we have been heavily handicapped until recently for the want of ground and a hall, but we now have both a good show yard and a good hall close to the railway station, and I hope every farmer in the district will take an interest in the society. I want to see the young men come forward. It will be for their own benefit to be up to date in farming. With low prices for produce, land taxes and many other things farmers have to face—which a few years back did not exist—they must be up to date. Take my advice and be up to date in all things, or I am afraid you will not continue on your farms.

“My best thanks are due to all who so kindly gave prizes for the Show.

“I thank my committee and the secretary for all the help received from them during the past year, which has been a year of hard work, and has meant the spending of a lot of valuable time, what with buying the ground and building the splendid hall which we now have.”

Himeville Agricultural Society.

FIFTH ANNUAL REPORT.

THE following is a copy of the Fifth Annual Report of the President of the Himeville Agricultural Society (Mr. Henry C. Gold), which has been sent to us for publication:—

“Gentlemen,—I have much pleasure in presenting to you the Fifth Annual Report of the Himeville Agricultural Society. In doing so, I am glad to be able to congratulate you on the fact that our district still continues to show signs of vitality and progress in spite of the very great and general depression under which the whole Colony has been suffering.

“In a large stock-breeding district like the Underberg, the regrettable slump in the price of cattle, chiefly due to the Tick Fever scourge, has necessitated the holding on to our stock with the expectation that something will yet turn up to save the situation, and it is our earnest hope that the Government's efforts to stay the dread disease will, in the near future, enable the cattle market to right itself, even if such a contingency should lessen the profits of the Durban Cold Storage.

“The losses amongst horses from Horsesickness have been particularly heavy during the past season, and we are all patiently awaiting the day when the Veterinary Department will be able to justify their existence by proclaiming either a preventative or a cure for this fell disease.

“As regards general farming in the district, after a long spell of dry seasons, the Clerk of the Weather has gone to the opposite extreme and given us one of the wettest ones on record; all crops grown on vlei lands suffered more or less on this account, and several samples of mealies exhibited had not had time to ripen sufficiently to pass the judges' test. In spite of the unusual amount of rain, however, I believe the district suffered less than usual from hailstorms.

“It was with universal regret that we learnt that the Government contemplated retrenching the Dairy Expert. This most useful and highly esteemed officer has done as much practical good as any other member of the agricultural staff, and, as there is still a large field for his teaching, I think you will agree that the proposal, if carried out, will not be a beneficial one to the farming community.

“In commenting on our Annual Show, held on the Agricultural Society's Grounds at Himeville on the 16th May last, I have pleasure in stating that we scored a distinct success by displaying steady improvement. Horses and cattle were forward in very large numbers and in improved show condition. That experienced judge Mr. F. C. Burchell was en-

thusiastic on the most promising exhibits of the young stock in the horse sections, and specially commented on the youngsters shown by Mr. T. C. Wilson. It is somewhat easy for a man to exhibit the imported animal, but it is far more creditable when the exhibit is a 'Spring-bok,' or otherwise, a Colonial-bred. The cattle sections were also excellent, and special mention must be recorded of the splendid strain of Devon cattle, in which classes Messrs. Hall & Marriott gained many honours.

"Although probably not quite within the scope of my report, I cannot help, at this stage, congratulating one of our residents, and a member of our society, on the splendid success he has achieved at the Royal, Durban, and several other shows in this Colony during this past season. I refer, as you know, to Mr. Harold Brown, who has, with oats, potatoes, and forage, proved that the Underberg Division leads the Colony.

"It is, probably, in these hard times, something like 'rubbing it in' to comment on a fact of which you are already too well aware, which is the necessity, in the near future, for the erection of a suitable Agricultural Hall. Until such is built, we cannot reasonably expect that our shows will ever be strong in the display of produce and manufactures, more especially dairy and home manufactures. I trust that a commencement may be made, on however small a scale, with the erection of a hall during the coming year.

"In conclusion, I may say that the best thanks of the society are due to the judges who officiated at our recent show, and carried out their duties so meritoriously. Many of these judges came long distances, and their services were much appreciated. I have also to thank the various office-bearers, and in particular the hon. secretary and treasurer, Mr. T. E. Marriott, for the zeal and energy with which the work of the society was carried out during the past year."

Malton Farmers' Association.

ANNUAL PRESIDENTIAL ADDRESS.

THE following Presidential address to the members of the Malton Farmers' Association was delivered at a meeting of the Association held on the 30th August:—

Gentlemen,—On account of the unavoidable and regrettable absence of your esteemed President, it falls upon me to make some remarks upon the events of the past season, as they affect agriculturists generally, and the members of this Association in particular.

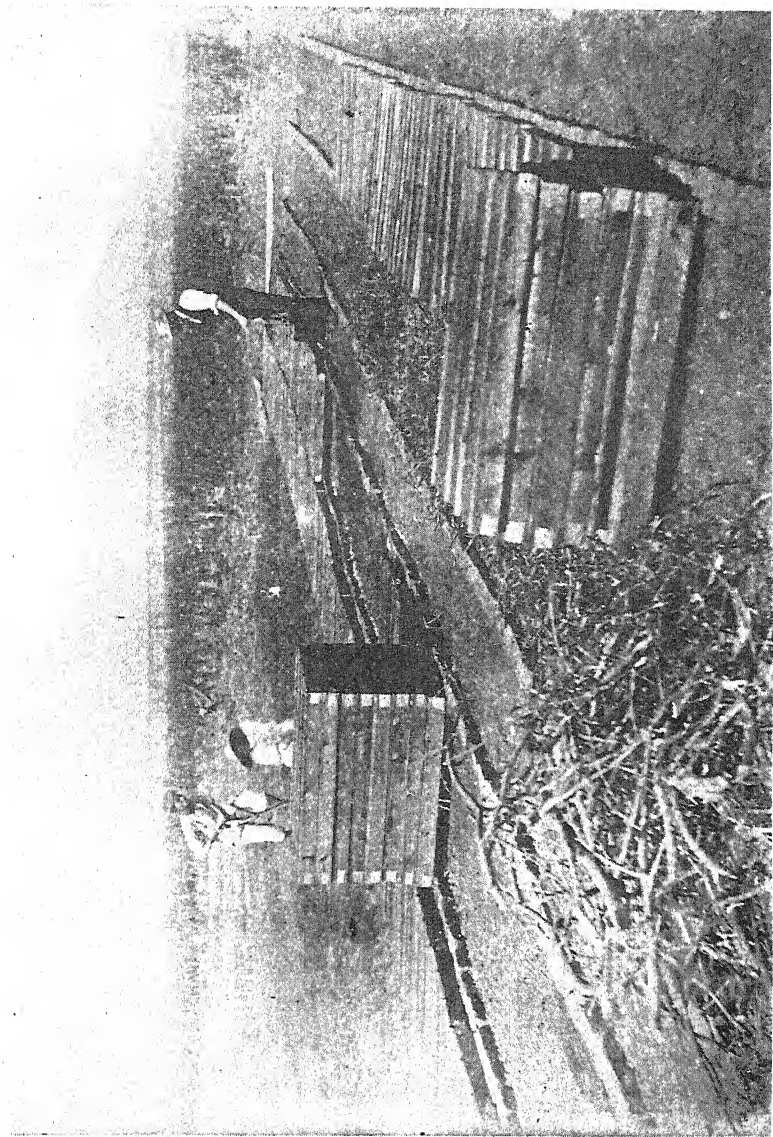
There have been two meetings of this society held during the past year. One was called in connection with East Coast Fever for the purpose of considering the advisability of having this Division declared a closed area. A resolution to that effect was passed. Another meeting was called for the purpose of electing delegates to the Agricultural Union. Your secretary and myself were elected delegates. Unfortunately, however, I was unable to attend for more than a few hours. As reports of the proceedings of the above Union appeared both in the *Agricultural Journal* and in the local papers, you are doubtless well aware of what those proceedings were.

As you are aware, a Commission has been travelling throughout the country collecting evidence on native affairs, and has issued a report, an abridgment of which no doubt you have all read. I have not heard that any members of this Association gave evidence before the Commission. I think it would be as well if a little more energy were displayed by this Association in the direction of these and similar questions.

A great deal of attention during the past year has been given to the land question by timber merchants, book-keepers and others, who have brought forward many and various ways of getting people back to the land and have urged upon the Government the necessity of providing funds to enable men to take up farming. Government, although not going quite so far as this, have brought forward several schemes by which assistance can be afforded to those who are willing to till the soil; and yet, contradictory as it may seem, have also introduced or intend introducing a land tax which will bear very hardly indeed on many who are doing their best to stay on the land and cultivate it. I cannot quite see the sense of taxing land that is being beneficially occupied. Tax, by all means, the land that is not so occupied, and so compel the owners to make way for those who are willing to make use of the land, and so add to the prosperity of the country and reduce the necessity of taxation.

The season through which we have just passed can by no manner of means be considered a prosperous one, although we may find consolation in the thought that it has not been so bad as it might have been. There has been, during the season, an unusual amount of rain, which must have done an incalculable amount of good to the country; although, at the same time, the fall of rain in some cases and in some places was frequently so great that from fields that are situated on the sides of hills a great deal of the soil was washed away and lost for ever. In this way some farms have suffered a great deal of damage. If the owners are wise they will endeavour to prevent, as far as possible, a recurrence of this washing away of soil by making proper and adequate ditches.

A great deal has been said with reference to the exportation of mealies to Europe, and great hopes have been raised—especially at the beginning of the season, when a promising young Minister of Agriculture told the people in different parts of the Colony that such excellent arrange-



TOBACCO SEED BEDS.
Weenen Experiment Station.

ments had been made by Government, for the exportation of mealies that growers living even as far up country as Dundee would be able to export mealies to Europe and obtain from 8s. to 9s. per muid at their stations after all expenses had been paid. This promise like a great many others in connection with agriculture, is hardly likely to be fully realised. An attempt has been made to establish a mealie-growers' union, the object of which would be to encourage the growing of mealies and to assist in the marketing of the same. Through lack of support, however, the attempt has not, so far, been successful. The main objection raised against joining such a union was the obligation sought to be laid upon members of having to pay $2\frac{1}{2}$ per cent. commission on all produce sold. A further attempt is being made to establish a union with this condition eliminated. How far this attempt will be successful it is difficult to say. The principles of co-operation do not appear to commend themselves very strongly to the Natal farmer.

Locusts have done a great deal of damage during the past season, but, thanks to the excellent results which have attended the spraying of the young hoppers with the arsenic mixture, whole crops of mealies have been saved which most certainly would have been destroyed were it not for the vigorous, persistent and praiseworthy efforts of farmers who night and day waged unceasing war against these destructive creatures. In many parts where the locusts were very plentiful we have had the pleasing spectacle of seeing record crops of mealies being reaped, and to these farmers we offer our heartiest congratulations and only regret that the price of the crop which they have laboured so hard to save is so low that the profits accruing from the sale of the mealies are almost nil.

In connection with the exportation of mealies to Europe, I think that, unless at least 7s. per muid is secured to the grower at his station, farmers would be well advised to try some other means of realising their mealies than by placing them on the market. It has been said again and again, by thoroughly practical men, that better results than 7s. per muid can be obtained for mealies by turning them into beef, mutton, and pork. If these seasons of good crops continue—and it is to be sincerely hoped that they do,—we may look forward to a continuance of low prices. We will then have to look about for a different way of utilising our mealie crop than that of simply selling it to the highest bidder for so much cash; and if these low prices stir us up to strike out on different lines and go in for raising this king of crops for the feeding of stock and so produce sufficient pork, bacon, butter, and other articles of daily consumption to enable us to put a stop to the vast importation of these articles, the low prices will have done an inestimable amount of good to the Colony.

With regard to the wattle industry: in this direction it is indeed pleasing to turn after seeing so much depression and despondency in other branches of business. From what one hears and sees, it would appear that the past year has been a good one for those who have been fortunate

enough to have wattles ready to strip. For, on account of the heavy rainfall, many plantations which for years have resisted all efforts at stripping have this season yielded golden harvests. Farms which a few years ago without wattles were worth only about 30s. per acre, have been recently sold at about five times that amount per acre, solely through being suitable for wattles and well planted with them. We may only hope that the industry will continue to flourish so that the purchaser as well as the seller may have cause for congratulation. The price of bark this year has been so good that many plantations of silver wattle have been stripped and the bark sold at remunerative prices. In this direction it would be well for the Wattle Growers' Union to exercise a little supervision and see that this, which at one time was considered worthless stuff, is sold under its proper name and not passed off by unscrupulous dealers as the genuine article, much to the damage and disrepute of the black wattle bark.

In one respect, we may claim to have been fortunate during this, in many respects, unfortunate year, and that is in having an adequate supply of native labour; and it seems almost a pity that we do not make better use of it than we do.

A resume of this year's agricultural events would not be complete without some reference to the fearful cattle plague, East Coast Fever, which has in many places decimated herds, and which hangs like a black cloud over the Colony, driving all the sunshine out of the lives of many of our fellow-colonists, who are deserving of our warmest sympathy and support. It appears to me that the only way to rid the Colony of this dreadful disease is by adopting a vigorous policy of stamping out, by destroying all cattle in infected areas. Fortunately the arrangements made for the slaughter of cattle at the Government Abattoirs are such that farmers can dispose of cattle that are in good condition at prices which, under the circumstances, may be considered fairly good; and they are thus enabled to a great extent the loss which they would otherwise suffer.

In connection with the efforts that are being made to put a stop to the importation of foodstuffs into this Colony, it is very gratifying to find that already some of the progressive farmers in our own Division are endeavouring to establish a bacon and ham factory and I think they are deserving of our active and practical support, and we surely can offer them some by taking shares in the company which they are promoting, and by supplying them with as many pigs as we can raise. It is undoubtedly in the direction of this and similar enterprises that we will have to turn if we are to raise the Colony from the low state of depression into which it has fallen.

As farmers and producers we will have to wake up, and put in some genuine hard work before we can expect to see things in a prosperous condition again. No doubt we have, as the President of the Agricultural Union said, an enormous amount of very poor land that is very poorly

adapted for cultivation. At the same time we have an enormous amount of good land that is either not cultivated at all or cultivated in a very poor and primitive manner. It is the general thing to blame the Government for the present depression, but it is my opinion (which I offer with a great deal of diffidence) that Governments, unless they are glaringly bad or uncommonly good, have not very much to do with the adversity or prosperity of a country. This depends more upon the people themselves, and most of all upon the farmers. For there is a great deal of truth in the old saying that the man who makes two blades of grass or two cobs of mealies to grow where previously only one had grown, does more good for his country than all the politicians a country ever produced. We must therefore be up and doing, endeavouring to the very best of our ability to enrich the country by making the land produce more and more, not for one moment giving credence to the foolish idea that the less we produce the better price we will obtain for what we produce.

Without wishing in any way to undervalue the beneficial recreation provided by different kinds of sport, I cannot help thinking that the youths and young men of Natal, especially amongst the farming community, spend far too much time at sports, to the unmistakable detriment of their business. It is no use a man thinking that he can spend three days a week playing either tennis, polo or cricket, and yet make the best use of his farm. To do this he must put his very best into it and make the most of his opportunities and these are indeed good: in fact, as good as he may expect to find anywhere. We hear a good deal about young men leaving the Colony for some other part that is supposed to possess better prospects than this Colony does. I do not think, however, that their expectations are always realised. Provided we are not handicapped by having to pay an iniquitous land tax, or by having our crops destroyed by locusts and our herds decimated by disease, I think we may safely and confidently look forward to a fairly prosperous future if we do the best we can with the opportunities which we possess.

The natives in Ashanti are showing great zeal in the planting of rubber and cocoa, and every encouragement is being given them by the authorities. During 1906 eleven thousand rubber plants were distributed free amongst the Chiefs, and these plants are said to be doing well. Numbers of the natives have been greatly impressed by the amount of money there is to be made out of cocoa, and around many of the towns very healthy plantations are springing up, which have every appearance of rewarding the growers in a few years, as well as increasing the trade of the Colony.

Natal Wattle Bark.

OUR MARKETS OVERSEAS.

PRESENT CONDITIONS AND FUTURE PROSPECTS.

At the request of the Prime Minister, enquiries have lately been instituted by the Agent-General for Natal in London regarding the prospects of wattle bark for the purpose of tanning in Britain, America, and on the Continent, and the markets which at present exist or are likely to be created in the future for that commodity. It was thought that such information, together with opinions from leading London and Continental brokers and others would be of value to Natal growers at the present time, as it is well known that other countries, seeing the success Natal has made of the industry, are taking up the cultivation of wattles for commercial purposes, and we in Natal will, therefore, need to overhaul our present methods and adopt any improvements that may suggest themselves or be suggested by others interested in the industry.

At the present time Natal seems to have no serious competitor in respect to wattle bark, its cultivated and expanding supplies going far to meet the naturally grown and diminishing supplies from the original home of the plant. There is, however, little doubt that sooner or later other Colonies in South Africa and elsewhere will compete successfully. Cape Colony, it is stated, is already well advanced in its cultivation. Experiments have been undertaken in German East Africa; and, according to a recent note in the *Bulletin* of the Imperial Institute, the Biological and Agricultural Institute of that Colony recently sent to Hamburg four bales of Black Wattle bark, which on analysis was found to contain from 27.9 to 41 per cent. of tannin, and which compares favourably with the amounts of tannin contained in the same bark as exported from Natal and Australia.

In the opinion of the writer of one of the letters which have been received, quebracho is one of the articles the competition of which we have most to fear. Prices for the solid extract have fallen within the last year from £18 per ton to £14, and sellers are pressing for offers. There are some big companies in the business who are handling thousands of tons every month: this extract is guaranteed to contain 60 per cent. of tannin.

Our wattle bark has also to compete with various other tanning materials, and particularly with mangrove and mallet barks.

The chief consumers of wattle bark are England and Germany, but it is almost impossible to arrive at accurate statistics owing on the one hand

to overlapping of figures and on the other hand to the absence of important data: thus, the London import figures include large shipments in transit for Hamburg, Antwerp, etc., while no figures are available for the separate Continental arrivals by the East African steamers. The actual imports of the last five years have been:—

	London, (Including Bark in transit.) Tons.	Hamburg, (All Sources) Tons.
1902	11,232	6,000
1903	10,649	5,250
1904	13,671	7,950
1905	11,914	8,100
1906	8,461	8,300

The English consumption for 1906 has been estimated at about 2,500 tons, so that Hamburg must have received in direct shipment some 2,000 tons more than were transhipped in London. During these five years the proportion taken by England and Germany, respectively, has been greatly modified, England's consumption declining from two-fifths of the whole in 1902 to less than one-third in 1906.

The Natal figures show the direction of our exports; and those for 1906 may be taken for the purposes of study. Our exports of bark during the year were:—

	lbs.
To United Kingdom	23,900,413
„ Germany	6,218,073
„ Russia	2,048,546
„ Austria	580,396
„ Belgium	300,119
„ To Mauritius	6,992
Total oversea	33,054,539
To other States in the S.A. Customs Union	142,369
Grand total	33,196,908

For the United Kingdom only sound, well-harvested bark is saleable, which, after being ground to make it soluble, goes straight into the pits. For this quarter the demand is more likely to fall off than to increase as the tendency to use extracts becomes more and more general.

In Germany most of the bark imported is made into extract, not necessarily pure extracts of mimosa, but mixed with other materials for increasing the percentage of tannic acid. For many years the German extract makers paid little attention to the condition in which the bark was shipped, and accepted weather-damaged bark at a very slight reduction off

the prices of sound. During the last two years, however, German buyers have become much more particular, and inferior qualities are very difficult of sale. Germany will probably continue to use wattle bark in quantity for some years provided the prices of competing materials, such as quebracho, gambier, myrabolams and valonia do not fall considerably, but this is stated to be hardly likely as there is little room for contraction in values.

At present Americans take very little wattle bark. They have tannin-producing barks of their own, such as oak, hemlock, and chestnut, and they are large importers of mangrove bark. The latter grows all over the world, and supplies are practically inexhaustible. The value at present time is from £4 10s. to £6 per ton, c.i.f., and it is probable that wattle would have to come down to about this price before the Americans took any quantity of it. Mangrove is usually sold with a guarantee of 38 per cent. tannin, and mostly contains 40 to 42 per cent., so that it may be considered a serious rival to Natal wattle bark for extract-making.

Russia is said to be a good buyer of Natal bark; and as trade in that country improves, more and more is likely to be taken. Most of the business appears to be done through Hamburg.

France, Denmark and Scandinavia take a little bark spasmodically, but none of these are likely to become large consumers. No other country, apparently, imports our bark.

In Belgium the tanning industry is of considerable importance. Many different tanning materials are employed, the principle among which are chestnut, quebracho, oak, hemlock, mimosa, myrabolams, valonia, divi-divi, and sumac. Quebracho is imported from South America, valonia from Asia Minor, divi-divi from Central America, mimosa from South Africa, and myrabolam from India. The British Consul-General at Antwerp was unable to say whether wattle bark from Natal would meet with a ready sale for tannin purposes. So far as he was aware, it was not at present being used in Belgium; and would-be sellers would, he points out, naturally have to show its advantages in price and results compared with other tannin materials.

One firm of brokers is "inclined to think that any great increase in the production of wattle in Natal will lead to a permanent fall in value in Europe, as there is not an unlimited demand for the article, which is used in conjunction with many other materials. Doubtless a fall in value would tend to increase the consumption, but it is difficult to say to what extent." Another firm, however, remarks that "there is no limit except price to the production of tannic acid"; and proceeds to point out that consumption depends on competition with other materials. Wattle possesses fewer merits, it is stated, than some of its immediate competitors, such as mallet. "Farmers will always buy and consume the cheapest material. About £8 10s. to £9 per ton, delivered on the basis of 35 per cent. of tannin, seems to be the level at which supply and demand are

fairly evenly balanced to-day. . . . One thing is certain: wattle can only replace inferior agents. It may prejudice the market value of oak bark and valonia, but can never oust them."

In this connection the Director of the Royal Botanic Gardens at Kew says: "Tanners require a material which, in addition to suitability for their particular purpose, must be abundant and regular. Although many products meet the one condition of quality, but few fulfil the other conditions as to quantity and regularity of the supply, and none perhaps so well as wattle bark. The industry therefore is not likely, for some years at least, to suffer by over-production."

In the opinion of one firm of brokers, although a large number of English tanners use wattle bark, more would be doing so if they could be sure of a regular supply of bark of a good quality.

The wattle bark grown in and shipped from Natal is described as "of good strength" and possessing "good spending power. The tannin is, however, light and volatile and not suitable for use alone. It must be used for mixed tannage with something denser." In England, where the bulk of the tanning is good, the very best agents are used—valonia and oak for firmness and density and terra japonica for speed. Another firm of brokers remarks: "Natal wattle bark is very extensively used all over the world for tanning purposes, and compares favourably with most other barks on account of the colour and higher percentage of tannic acid it contains, ranging from 35 to 40 per cent."

The correspondence which has been received and forwarded by the Agent-General contains some remarks of interest upon the condition in which bark is stripped, packed, and exported from Natal. One firm of brokers, for instance, comments: "The wattle bark business, however satisfactory it may be to the Natal grower at present, is not equally so to the firms engaged in its distribution, for, owing to the slovenly manner in which the bark is harvested in Natal, it frequently arrives here in a more or less damaged condition from rain, with the result that heavy allowances have to be made to buyers. It is greatly to be wished that the farmers in Natal would take more care during the rainy season to harvest their bark in proper condition. The proportion of damaged bark shipped from Natal this season has been unusually large, and we have heard of allowances of as much as £3 per ton. This, however, is very exceptional."

In the opinion of another firm, what does, and has done, harm to the trade, is the quantity of poor bark that comes on to the market. It is offered at a tempting price, and a tanner who has not previously used any may be tempted to go in for a trial parcel. He finds the bark does not come up to his expectations and accordingly concludes that all Natal bark is equally poor. "A great deal of the bark that comes to this country," the letter proceeds, "is bought by bark dealers in Natal, from small growers, who have either not got suitable accommodation for proper harvesting, or will not take the necessary trouble to see that the bark is kept quite free from moisture, which greatly deteriorates the quality."

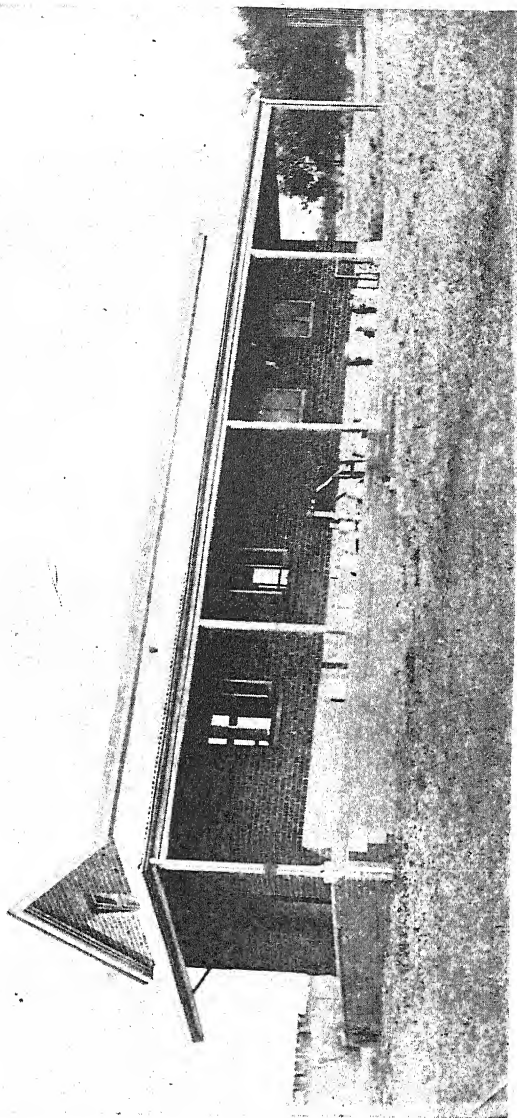
In another letter the writers point out that there has been great dissatisfaction among buyers this year in regard to quality. This does not apply, it is stated, to the actual quality as to the condition. "The season has no doubt been a wet one in Natal, but we think greater care might be taken to keep the bark from wet after it is shipped. Bark that has been wet is called 'weathered,' and usually breaks discoloured."

Amongst the principal tanning materials other than wattle bark, now on the market, the Director of the Royal Botanic Gardens, Kew, says, are the following:—

"Cutch" or "Black Catechu," an extract obtained from the heart-wood and pods of *Acacia catechu* and *Acacia suma*, from the Dutch East Indies, British India, etc.; "Gambier"—leaves and shoots of *Uncaria Gambier*, grown in the British East Indies, Straits Settlements, etc.; "myrobalams"—the fruits of *Terminalia chebula*, coming from British India and Ceylon; "sumac"—the powdered leaves of *Rhus coraria* of Spain and the Mediterranean Region; "American sumac" (*Rhus glabra*); "valonia"—acorn cups of *Quercus aegilops*, from Austria Hungary, Greece, and European and Asiatic Turkey; "mangrove extract," from British North Borneo; mangrove bark from Mozambique, etc.; mallet bark (*Eucalyptus occidentalis*) from Western Australia; "quebracho wood" (*Quebrachia Lorentzii*), from the Argentine Republic, and the European oak bark.

What is said to be the most perfectly formed mule in the world was recently sold at East St. Louis (U.S.A.) for £833 to a Pittsburg firm for exhibition purposes beside a hairless horse. The mule weighed 1,960 lbs.—almost twice the weight of an ordinary mule,—and is over eight feet high and without blemish.

It is always advisable to have plenty of shade for the poultry, particularly in a country such as this. A satisfactory way of providing shade is to build the chicken run near growing trees—the orchard is preferable; and there are two advantages to be gained from having the run in the orchard. The fowls eat the insects that infest the trees, and the trees provide shade for the chickens. Temporary shade can be provided by covering a framework with canvas or ducking, or even sheeting, or better still, small evergreen trees may be cut and trimmed about 1 foot and set in the chicken run. They provide shade to last half the summer through,



THE DAIRY, CENTRAL EXPERIMENT FARM.

Production and Export.

MR. C. H. MITCHELL'S VIEWS.

IN the *Natal Mercury* of the 31st August Mr. C. H. Mitchell, of Imbizana, gave his views on the present position of agricultural production in Natal, in the form of an interesting letter; and in view of the importance of the subject at the present time, we reproduce below his letter, which will doubtless find many interested readers. Mr. Mitchell shows clearly that, production in this Colony in many lines having practically reached the limits fixed by local demand, an export trade must be established to provide a market for an ever-increasing surplus in those lines. Farmers must accordingly grow for the purpose of exporting. Mr. Mitchell says:—

A great deal has been written of late concerning the need there is in Natal for a considerable increase in the farming population. We have been told that the land is "crying out for men"; that the demand for farm produce far exceeds the supply; that for any man who will "go on the land," whether he has capital of his own or not, or whether he has any experience or not, there is a sure and satisfactory income awaiting him. There are also many who, while refusing to accept the last statement, still feel there is room in abundance for a far greater agricultural population in Natal, and that the only real hope Natal has of sure prosperity is by a very large increase in its agricultural products. The matter is of such vital importance to the Colony that the most careful consideration should be given to all sides of it. Unfortunately, most of the writers on the subject have had little or no practical experience, and while their constant pressing of the subject on the attention of the people is worthy of all praise, yet their lack of practical knowledge often lets them fall into serious mistakes. As a Natal farmer, then, I would like to add my quota to the subject.

Agriculture in Natal includes so many branches that confusion easily arises, but I think it may be divided into two main divisions, viz., producing for the local market and producing for export. With a few exceptions, the present demands for agricultural produce locally are well supplied, and there is no room for further producers. It is very easy to prove this statement. Good agricultural land close to the main line of railway, if offered at a very low figure, will be taken up, as the position of the farm gives an advantage in the local market over those farmers who live farther away, but any quantity of land 20 miles and upwards from the railway is going begging, simply because prices in the Colony for produce are now cut so fine that the 20 miles or so of transport exhausts the profit. Take,

for instance, the staple articles of produce: good potatoes are now selling on the Durban market for 6s. a bag, and this is supposed to be the dearest time of the year for them. Any time this year good potatoes could have been bought for that price on the market. Mealies are from 6s. to 7s. a muid, and have been at that price since the new crop came in. Fruit is a drug in the market, except in very small quantities. Milk and butter still bring fair prices, but only those farms close to the railway can do anything in these lines, and with the present outlook of East Coast Fever, etc., a man with the capital necessary to start dairy farming would think twice before putting his money into such a risky undertaking just now. Where a big run can be obtained with swamps, etc., pig-raising pays fairly, but if all the food for them has to be grown, it is not worth doing. I say, then, without fear of contradiction, that the local markets are, on the whole, well supplied, and that there is no chance for small beginners making a living catering for that market; that in good seasons the prices now are so low that only men with a big turnover can make a living out of them, and in a bad season a small farmer would be wiped out. Johannesburg, which used to be the market for Natal, is now supplied from the Transvaal and O.R.C., prices there being generally as low as in Durban; and with the hundreds of people who are now leaving the country, our local markets are getting smaller, rather than increasing in size. The only hope, then, for agriculture in Natal is to grow for export, and any man starting farming now would be well advised to have that object mainly in view, unless particularly favoured by some fortuitous circumstance as to position of land, etc.

What, then, can be produced in Natal that it will pay to export? That and the native question are the two most important subjects Natal has now to face. First, I think, must be placed wattle bark, and, given the right land and the capital necessary to wait for the crop to mature, that is a safe industry to invest in, but it is hardly suited for the small beginner. Where sheep can be kept, and a sufficiently long run obtained, wool is paying well just now, and likely to; but there, again, there is no chance for the starter on a small plot of land. Thanks to the exertions of the present Government, it looks hopeful that a market may be found at Home for Natal mealies, and, with the low rates obtained from the shipping companies, there are good prospects of that becoming one of the best outlooks for a beginner. If it can be proved that good Natal mealies, such as the ordinary farmer can grow, will fetch 25s. a quarter on the London market, that about that price can be relied on, and that railage and shipping rates will be kept down, mealies for export should pay; and a man with fair land, keeping pigs, fowls, etc., to feed on his poor mealies, and exporting his best, should be able, with fairly good fortune, to make a living. Fruit, too, is another product for which there are great hopes.

The prices fetched this season at Home for oranges and naartjes, especially oranges, surprised many of us. This fruit will grow freely all along the coast belt, and in many parts of the interior of Natal. When the fruit gets known at Home, the demand should increase, and as the growers gain knowledge in packing for shipment, etc., naturally a higher standard should be obtained; but with good average Natal oranges fetching 1d. each wholesale on the London market, there is a big future for the small grower as well as the big one. Here, again, we have to thank the present Government for the help they have given to the trial shipments of fruit. While oranges and naartjes especially seem to offer great attractions for export, there is every reason to believe that other fruits, such as pines, apples, etc., will also find a paying market in Europe. The export of pines is, I believe, to be given a good trial this coming season, and it is to be hoped that every grower will send at least some of his best Home to give the business a fair test. Then, given that after paying all expenses, 2s. net a dozen is left for the producer, few crops could offer greater inducements to the small settler. The question should be settled this coming season. There is another crop that a good deal has been heard of lately, and of which great things are expected. I refer to fibre. Our knowledge concerning this crop is still, unfortunately, very slight, and any farmers taking up the cultivation of that plant would be well advised to go slowly till more knowledge is obtained. Still, men like Mr. Sim and others, whose opinions are valuable, think that, given suitable land, the industry will be a success in Natal, if properly carried out, and numbers of farmers and others are now putting tracts of land under its cultivation. On good land it has given, we are told, up to a ton of fibre to the acre, valued at £30 to £35 a ton on the London market. With a valuable crop like that, distance from the railway is not of so much importance, so that it would seem to be a crop well suited to the coast lands lying off the railway, and of which a small acreage, well cultivated, would give a reasonable return.

The list of crops that it will pay to grow for export is still far too short, and every encouragement should be given to increase its length. The man who can show a new product that can be grown in Natal at a profit for export has done more for the country than the one who finds a gold mine. At the same time, if even these few turn out the success it is hoped they will, a good opening will be shown for larger numbers on the land. As a farmer, then, I would urge that every encouragement be given for finding fresh articles for export, and that anyone contemplating settling on the land in Natal should aim at growing those crops for which they will have the world as their market, rather than to try and struggle among the crowd for the very limited and generally overstocked local one.

Experiment Farms.

SCHOOL OF AGRICULTURE.

THE following is the curriculum of the Government School of Agriculture at Cedara:—

FIRST YEAR.

1.—*Principles of Agriculture.*

Lecture Course by Director, Experiment Stations (45 lectures).—Cultivation; farm drainage; irrigation; staple crops; seed selection; farm mechanics; farm buildings.

Practical Instruction.—Field operations (2 months); construction and maintenance of farm implements; water engineering (2 months); farm carpentry; construction of wood, iron and brick buildings (2 months).

2.—*Animal Husbandry.*

Lecture Course by Director, Experiment Stations (45 lectures).—Principles of stock feeding; studying of breeds and management; stock judging.

Practical Instruction.—Ration feeding of dairy cows, steers, calves sheep, pigs and poultry; stock judging; bacon-curing; sheep shearing; butchering. (Special courses.)

3.—*Agricultural Chemistry.*

Lecture Course by Analyst (45 lectures).—The atmosphere in relation to plant life; soils, their physical and chemical properties; composition of soils and their improvement; elementary soil bacteriology; manures and fertilisers, their composition, properties, uses and valuation; crops, their composition, manurial requirements, and influence on soils; rotations, their chemical and physical influence; elementary physiology.

Practical Instruction.—Laboratory demonstrations and experiments. (Special courses.)

4.—*Dairy Farming.*

Lecture Course by Dairy Instructor (12 lectures).—Milk, its secretion and composition; dairy implements, their construction and maintenance; elementary dairy bacteriology; manufacture of butter and cheese.

Practical Instruction.—Milking; hand rearing of dairy calves; butter and cheese manufacture. (Two months.)

5.—*Veterinary Science.*

Lecture Course by Mr. Goule, M.R.C.V.S. (24 lectures).—Stock diseases of South Africa, their diagnosis, treatment and prevention; animal parasites; veterinary medicine; farm hygiene.

Practical Instruction.—Obstetrics and simple operative surgery; preventive inoculation; preparation and examination of blood slides; farriery. (Special courses.)

6.—*Economic Entomology and Plant Pathology.*

Lecture Course by Government Entomologist (24 lectures).—Injurious insects and diseases of farm and orchard: their identification, life histories and control.

Practical Instruction.—Preventive selection; spraying of crops and orchards; fumigation and netting of fruit trees. (Special courses.)

7.—*Botany and Forestry.*

Lecture Course.—Plant anatomy; elementary systematic botany; economic botany; sylviculture; forest management, protection, and utilisation.

Practical Instruction.—Practical botany; propagation of forest trees; planting; conservation; surveying. (Two months.)

8.—*Horticulture.*

Lecture Course.—Pomology; cultivation of small fruits; vegetable gardening; packing; manufacture.

Practical Instruction.—Planting; budding; grafting; pruning; market gardening; packing. (One month.)

9.—*Poultry Farming.*

Lecture Course by Director, Experiment Stations (8 lectures).—Buildings and appliances; incubators; the egg farm; poultry for table and market; turkeys; geese; ducks.

Practical Instruction.—Management of the Model Poultry Farm. (Special course.)

10.—*Surveying, Mensuration, and Farm Book-keeping.*

Lecture Course by House Master.—The chain and compass; field notes; plotting and balancing of surveys; mensuration; systems of farm book-keeping.

Practical Instruction.—Plane and contour surveying with chain, level, and compass; plotting of drainage and irrigation schemes; measurement of stacks, tanks, timber, building materials, etc.

SECOND YEAR.

1.—*Tropical Agriculture.*

Lecture Course by Director, Experiment Stations (45 lectures).—Staple crops of the Natal Coast; climatic requirements, cultivation and treatment; special insect pests and plant diseases.

Practical Instruction.—A study of plantation systems at Government Experiment Farm, Winkel Spruit; visits to leading estates on the Natal Coast. (Three months.)

2.—*Agricultural Irrigation.*

Lecture Course (45 lectures).—Irrigation law; hydraulics; water supplies; masonry dams; canal management; irrigation research.

Practical Instruction.—Practical irrigation and the Government Experiment Station, Weenen; visits to irrigation systems of Natal; irrigation surveying and drafting in the field. (Three months.)

3.—*Agricultural Engineering (Mechanical).*

Lecture Course (12 lectures).—Trigonometry; mechanical drawing; descriptive geometry; strength of materials; roofs and bridges; roads; concrete; steam boilers; steam engines; farm machinery.

Practical Instruction.—Special workshop and laboratory courses.

4.—*Veterinary Science.*

Lecture Course (45 lectures).—Special pathology; anatomy and operative surgery; bacteriology; materia medica; clinics.

Practical Instruction.—Special laboratory courses.

5.—*Agricultural Chemistry.*

Lecture Course by Analyst (24 lectures).—Soil fertility (research); stock-feeding (research); dairy bacteriology and chemistry.

Practical Instruction.—Laboratory courses.

6.—*Electives.*

Lecture Course.—Plant breeding; special crops; soil and manure analysis; organic chemistry; systematic botany.

Practical Instruction.—Special courses.

E. R. SAWER,

Principal, School of Agriculture;

Director, Experiment Stations.

It is estimated in the United States that one acre of potatoes will produce 500 gallons of alcohol, and that a bushel of mealies will produce about $2\frac{1}{2}$ gallons of alcohol.

To make chilli sauce, take thirty ripe tomatoes, ten onions, six green chillies, two cups of sugar, five tablespoonsful of salt, one pint of vinegar. Peel tomatoes and cut; chop onions; and boil for two hours.

Laboratory Notes.

By ALEX. PARDY, F.C.S., Analyst.

COPPER SULPHATE.

SAMPLES of what should be copper sulphate occasionally come to hand, and the unsatisfactory results attending the examination of some of these point out the necessity for exercising care in the purchase of this material.

Copper sulphate, blue stone or blue vitriol is obtained in the pure state in the form of very pretty, dark blue crystals, a salt which is isomorphous. With it is ferrous sulphate, and it sometimes happens that this salt forms a large impurity in the blue stone; in extreme cases it may even largely exceed the copper salt.

Apart from the injury that may arise from a use of the wrong salt, and the utility or effectiveness of these two salts in their agricultural uses, which depend on the specific purposes for which they are applied, the sulphate of iron is a much less expensive article than the sulphate of copper, so that when the latter is required it is advisable to ascertain that it is not wholly or partially substituted by an article inferior both in quality and price.

It is perhaps rather difficult for those who are unacquainted with the appearance of the crystals to distinguish the one salt from the other, but if samples of the two salts be placed alongside each other the difference is at once seen to be very striking and unmistakable; the dark blue crystals of the copper salt being so utterly unlike in colour those of the light bluish-green crystals of the sulphate of iron.

Various simple tests are recommended to distinguish between these salts. In one the polished blade of a knife is inserted into a solution of the salt made by dissolving a few of the crystals in water. On withdrawing the blade after it has stood in the solution for a little time, it will be found to be coated with a thin layer of metallic copper if that metal has been present in the dissolved material. This test, however, only shows the presence of copper; and as the same thing will happen should there only be a small proportion present, it does not give sufficient proof of its purity. Perhaps a better plan is to dissolve a little of the salt in a tumbler half full of water, then to add to it a minute quantity of weak ammonia. The presence of copper will be shown by the formation of a pale blue precipitate which, on the further addition of ammonia, dissolves and imparts to the liquid a dark blue colour. Should the liquid retain this colour and remain clear after standing for some time it may be assumed to be a good copper salt; but if, on the other hand, a dark brown precipitate settles out on standing, this may be taken as denoting the pre-

sence of iron, and the bulkiness of the precipitate will be in proportion to the amount of this impurity present.

Salts known as "double vitriol" have been met with. These contain but a small percentage of copper sulphate, and are intermediate in colour between copper sulphate and iron sulphate, but have less of the intense blueness of the former. These contain from 17 to 24 per cent. of copper sulphate, the balance being principally sulphate of iron.

The ordinary commercial bluestone as obtained nowadays is a high grade salt and is the one most generally used for agricultural purposes.

LIME.

Reference is here made to a series of three samples of limestone recently obtained from Lilassi Hot Springs district and reported on page 546 of the *May Agricultural Journal*. The samples contained respectively 75.62, 80.30 and 91.36 per cent. of carbonate of lime and 2.02, 1.96 and 2.08 per cent. of magnesium carbonate.

These appear to have been obtained from a large and valuable deposit which, according to Mr. St. Vincent Erskine's letter reproduced below, are capable of being worked to great advantage. The prospect of a high class burned lime at 21s. per ton should be a very encouraging one to agriculturists.

Letter From Mr. St. Vincent Erskine.

"A. Pardy, Esq., Analyst.

"Dear Sir,—In your article on my marble (limestone) property at Lilassi Hot Springs you refer to the third sample with the smallest amount of lime, 75 per cent., being a brown stone.

"This sample was searched for at the suggestion of Mr. Jesse Smith as a building stone similar to bath stone and not for its lime contents.

"You refer to the samples as excellent 'if they are a fair sample of the average rock.' I may say that they are an average bad sample—second class, I might say, as they were knocked off loose pieces lying alongside the footpath.

"If you get the analysis published in the *Agricultural Journal*, it would keep it on record—for general reference—and be useful.

"If larger samples up to one or two cwt. would be of any service, I can get them and send them to you. As the deposit extends for four miles, I can get samples four miles apart and some from the centre, and thus you can judge of the quality and average nature at these extreme points.—Yours, etc.,

"ST. VINCENT ERSKINE.

"P.S.—There is no doubt that we can sell the lime either in caustic form or ground to powder at 21s. per ton at Hermansberg Road (Mizpah) Station."

Gardening Notes for October.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

MAKE full sowings of all kinds of vegetable seeds—Dwarf Beans, Radish, Lettuce, Carrot, Beet, Onion, Tomato, Marrow, Pumpkin and Squash, Egg-plant, Capsicum, Spinach, Leek, Mustard and Cress, Parsley, etc.

Where Celery is required, this should be sown before the end of the month. Some care is necessary in raising this crop from seed, and the most sheltered position in the garden should be selected for the seed bed or boxes—open to the morning sun, with protection from the north, but quite clear of overhanging tree branches. Stiff soil must be lightened by the application of sand and ashes and a surface formed that will not easily harden after being watered.

Sow the seed thinly and evenly on the surface, and after lightly raking it over cover the bed with litter of some kind. Straw is the best, but hay or grass will serve the purpose. The advantage of straw is, that there are no weed seeds with it which are very troublesome amongst Celery seedlings. If a sheltered position in the open is not available in the garden, sow in boxes on the south side of a building or high wall. To ensure a crop it is a good plan to sow in boxes, as well as in the open, as open ground sowings will often fail in spite of every care.

In dry weather watering will be necessary both morning and evening.

Young Onion sets should be planted out this month from the autumn sowings.

Plant out Tomato, Marrow, Cucumber and Cabbage plants. The tall growing varieties of Tomatoes should be staked and should not be allowed to trail on the ground. A mulch of half decayed stable manure round young plants will assist the growth in dry weather by conserving the moisture about the roots, and less watering will be required. If grub is troublesome sprinkle a little lime dust round the stems, after forking a little in with a hand fork and replace the mulch.

Keep down weeds between the rows of growing crops and the surface continually loosened with the hoe. This is especially necessary where the ground is heavy and liable to harden after rain. The most useful implement for this purpose is a three-pronged fork which has the prongs set at right angles to the handle and which can be used like a hoe.

FLOWER GARDEN.

A great variety of flower seeds may be sown this month, including all the tender and half-hardy annuals.

In addition to the old favourites which are grown more or less in nearly every amateur's garden, there are others which are seldom seen but which should have a place in every garden where space is available, such as the following:—

Acroclinium (everlastings) in pink and white.

Amaranthus: Richly coloured foliage.

Calandrinia: Flowers resembling the *Portulaca*, but on long stems.

Centaurea Americana: Handsome thistle-like flowers, mauve colour, growing to a height of 5 feet; long stems, good for cutting.

Datura: Trumpet-shape flowers of the moonflower type in white, purple and yellow.

Helichrysum (everlastings): Most useful for winter bouquets when flowers are scarce. Colours: Crimson, white and yellow.

Platycodon: A perennial variety of *Campanula*; tuberous roots, flowers blue and white.

Galtonia Candicans (Berg Lily): Spikes of pure white flowers.

Freesia (Cape Cowslip): Sweetly scented bulbous plants.

Heliothis Pitcheriana: Yellow flowers, useful for cutting; keep fresh for a long time.

CLIMBERS.

Aristolochia: Evergreen creeper, curious shaped flowers.

Clitoria ternatea: Pea-shaped flowers, beautiful shade of blue, also in pure white.

Ornamental Gourds: Curious shapes, resembling various kinds of fruits, Oriental water bottles, hens' eggs, etc. Well adapted for trellis.

Morning Glories (*Ipomea*): Beautiful flowers, ruffled and frilled, all colours; very rapid climber for covering trellis.

Physianthus Albens: Hardy evergreen creeper with small, white, Campanula-shaped flowers.

All these may easily be grown from seed with ordinary care.

Plant out in suitable weather all kinds of border plants, such as Carnations, *Phlox decussata*, Pentstemons, Geraniums, Achilleas, *Anemone Japonica*, Salvias, Rudbeckias, Perennial Coreopsis and Gaillardias, Heliotropes, Iris, Barberton Daisies, Hunnemannias, Swainsonias, Tube-rose, Lily and Amaryllis bulbs, Montbretias and Tritonias.

For a back-ground plant Cannas in variety, *Alpinia Nutans*, *Hedychium gardnerianum*, Papyrus, Dahlias, Cordylines and Cacti of different kinds. A neat edging can be formed of Shasta or Ox-eye Daisies, evergreen flowering shrubs. Fruit and ornamental trees may now be planted out, also evergreen fence plants, such as Privet Thuja, Amaturgulu, etc.

Correspondence.

CANNING MEALIES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In the April issue of the *Journal* there appeared (page 437) a request from Mr. F. Harcourt for a recipe for canning young mealies. I have lately come across the following recipe for canning mealies, given by a writer in the *American Agriculturist*, which may meet Mr. Harcourt's requirements:—

"Choose choice sweet corn and cut from cob. With a wooden potato masher pack this cut corn as tightly as possible in glass jars. There should be at least two inches of juice in each can. Screw the lids on without the rubbers. Prepare the boiler by laying sticks on the bottom so that the jars will not rest directly on the bottom of the boiler. Then put in hay and pack the jars in as close as possible. Put in cold water up to the lids. Boil for three hours, then remove, put in rubbers, screw down tightly, return to the hot water and boil one hour. If these directions are followed there will be no failure."—Yours, etc.,

"SUBSCRIBER."

Working with good machinery is a pleasure, and it is more economical. When you are buying a machine, buy the best, and keep it in prime condition.

The American Alcohol and Sugar Co., of Oxnard, California, U.S.A., intends to establish a plant for the manufacture of denatured alcohol. Wake up, Natal!

According to an expert of the Department of Agriculture, Washington, about 50 per cent. of imported eggs rarely reach the breakfast table until they are four years old.

Animal Diseases in August.

POSITION OF EAST COAST FEVER.

MR. S. B. WOOLLATT, the Principal Veterinary Surgeon, in his report to the Minister of Agriculture for August, describes the position of East Coast Fever in each of the more important infected districts.

VRYHEID AND NGOTSHE DISTRICTS.

In these districts the disease continues to make steady progress. Approximately 1,000 deaths occurred during the month. Seven thousand cattle were railed from Vryheid for slaughter during the month. The branding of cattle in these districts has been carried out.

PAULPIETERSBURG DISTRICT.

Three fresh outbreaks occurred on the farms "Welverdiend," "Halberton," and "Nooitgedacht." On the last-named farm the owner has removed his cattle to clean veld, passing them through a temperature camp. The several outbreaks which have recently occurred in this district have not increased the infected area to any great extent, as they all adjoin infected veld. These outbreaks are doubtless, in Mr. Woollatt's opinion, extensions due to overlapping in grazing, etc.

UTRECHT DISTRICT.

During the month cases of East Coast Fever occurred on the farms "Langerwacht" and "Schuimshoek." On the former one death only took place, and on the latter there was one sick animal. These farms are in the infected area in connection with the outbreak on "Waterhoek" reported last month. All the cattle, numbering 1,162 head, on the farms "Witumverloos," "Jachtpad," "Lyspruit," "Weltevreden," "Schuimshoek," "Waterhoek" and "Langerwacht," have been branded "Z3" on the cheek.

DUNDEE AND UMSINGA DISTRICTS.

A fresh outbreak occurred on the farm "Spendikron." The infection here was reported by D.V.S. Hutchinson to be due to the overlapping of grazing from the absence of fences between this farm and the infected area "Vaalkop." One hundred head of cattle are involved in this outbreak; these are in a temperature camp.

A recurrence of the disease has occurred on the farm "Reitbokspruit," immediately adjoining the infected farm "Sterkstroom." Up to the 16th September two deaths had occurred from East Coast Fever and nine from anthrax, which disease also exists on the farm.

KLIP RIVER DISTRICT.

There has been no extension of the disease from infected area at Wessel's Nek and Sunday's River. Eighty-two deaths have occurred during the month.

The whole of the cattle in the district, on the east of the main line, numbering 17,988, have been branded.

WEENEN DISTRICT.

In the Muden area all the cattle on the Crown Lands and the farm "Sutherland" were removed for slaughter at the beginning of the month. This, however, only dealt with the cattle on the actually infected veld where they were dying, and as it did not deal with the in-contact cattle it was not considered in the light of stamping out the disease.

Mr. Verney reports on the entire lack of co-operation on the part of the native owners in this area, not only in complying with quarantine regulations, but also as regards the welfare of their own cattle. It is only with the greatest trouble that any effort is made to herd their stock. As the veld which is infected and has been cleared of cattle is the best for grazing purposes, the natives stock show a great disposition to get to it, regardless of fences; and, of course, "animals may get access to this veld and be removed by the owner without our knowledge, when the source of the outbreak of disease probably resulting is wrapped in mystery so far as the owner is concerned," Mr. Woollatt remarks.

UMVOTI DISTRICT.

In the Muden area on the Umvoti side of the Mooi River there have been no fresh outbreaks during the month.

DURBAN AND UMLAZI DISTRICTS

No fresh outbreaks; 32 deaths during the month; branding proceeding.

INANDA AND INDWEDWE DISTRICTS.

There have been three fresh outbreaks during the month, on the farm "Frostley," amongst Indians' and natives' cattle. These outbreaks are not really fresh centres of disease as this farm is divided into small lots with no fencing and the cattle intermix. Forty-seven deaths have occurred during the month.

LOWER TUGELA AND MAPUMULO DISTRICTS.

The disease continues to extend in these districts. There were 878 deaths reported during the month; five more deaths have occurred on the Compensation Flats, and unless the cattle here are removed for slaughter there will be greatly increased mortality. The branding of cattle is being proceeded with.

ZULULAND.

At the Mseleni, in the *Ubombo District*, 19 deaths occurred during the month. In the *Ndwandwe and Hlabisa Districts* the gradual spread of the disease from the infected centres still continued. One fresh centre on the *Ubombo-Nongoma Road*, near the Banganomo kraal, eight miles from the nearest infected veld, occurred. During the month 520 head were railed for slaughter. No record of deaths is kept. In the *Mtunzini and Lower Umfolosi Districts*, the disease has broken out at four centres around Ginginhlovu, but in each case the disease has appeared in cattle belonging to one owner, and these cattle are thought to have picked up the infection at the Amatikulu Drift. On account of the history and evidence obtained in connection with the Militia transport oxen which were running in this district for some time, this locality has been considered by the Veterinary Department highly suspicious. There were 333 head of cattle removed for slaughter.

Eshowe District.—In this district there have been no fresh cases around Eshowe village. Towards the Tugela, however, the disease has broken out at six native kraals at Enemba and at ten kraals at Inyoni.

EAST COAST FEVER INFECTION.

During the month the Compulsory Fencing Act has become law. It has been put into operation in the districts of Klip River, Weenen, Inanda Dundee, Umsinga, Umlazi.

In the reports on East Coast Fever which have been made from time to time, it has always been pointed out that infection, in practice, is carried from one place to another by the movement of cattle; and although theoretically it is known that it is possible for animals (including human beings) other than cattle to carry infected ticks, yet so far it has not been possible to establish a case of infection due to this cause. There are records of two or three cases where grass from infected veld, fed to stable cows, has been the source of infection. There have been many cases where the source of infection has been attributed to natives carrying infected ticks, but so far, in each case, it has not been possible to eliminate the probability of cattle being the source of infection. It is not always possible, says Mr. S. B. Woollatt (Principal Veterinary Surgeon), in his monthly report, to obtain the facts concerning movement of cattle which are responsible for the spread of the disease, for many reasons; and this is rendered more difficult as it frequently happens that the movement which is often responsible for starting a fresh centre of infection takes place many months before such fresh centre makes itself evident. If natives or others were capable, in any practical degree, of carrying infection from infected to clean veld, Mr. Woollatt thinks it must be admitted that the disease would exist to-day throughout Natal and probably throughout South Africa, as no restrictions whatever have been placed, for some time

past, on the movement of animals or of natives through or from grossly infected veld.

The following two cases were thought at the outset and are still thought by some to be due to infection having been carried by natives; and they are accordingly mentioned to show that in each case the probability of cattle themselves being the source of infection is as strong or stronger than the natives carrying ticks were. Short of being able to eliminate the probability of the cattle being the means of infection, in consideration of the points already mentioned, Mr. Woollatt thinks the source of infection must be attributed to cattle in these cases.

The first case was an outbreak of East Coast Fever amongst breeding stock, the property of Colonel Addison, near Stanger, which it is understood he claimed were free from East Coast Fever and that the paddock in which he placed them was also free from infection when he double fenced it and placed the cattle inside. East Coast Fever was known to exist in Stanger in August, 1906; but there is no doubt, Mr. Woollatt thinks, from subsequent events, that the infection was spread generally around Stanger during this month. Col. Addison removed his milking cattle from the Stanger commonage before that place was put in quarantine, but there is no doubt that the commonage was well infected before quarantine was imposed. Soon after removal three head of these cattle fell sick, two of which were shot, the third being stated to have recovered. At this time practically everyone around Stanger denied the existence of East Coast Fever. These cattle, it is understood, became sick in Col. Addison's paddock. The question of the source of infection of these cattle is not questioned. Since last August the mortality around Stanger has been very high and the infection very gross. The matter under consideration, Mr. Woollatt says, is how Mr. W. B. Addison's cows, which were placed in a paddock adjoining the one above referred to (which was erected in September, 1906), became infected. The cattle were placed there in September, 1906, and two became ill from East Coast Fever and died in May, 1907. According to the plan sent up by the D.V. Surgeon, who was instructed to make careful enquiries, it is shown that the paddock was not double-fenced and that the cattle were brought out of the paddock daily into the small kraal opposite the gate, and outside the paddock, to be milked. Hence it will be seen that there is a possibility of the veld being infected before the paddock was erected, and secondly and more important, as the cattle were taken out of it daily, the value of the fenced paddock was reduced to nothing. With reference to the double-fencing of the paddock containing Mr. W. B. Addison's cows, the plan (which the D.V. Surgeon states was copied from a sketch plan made by Col. Addison himself) shows it to be double fenced on two sides.

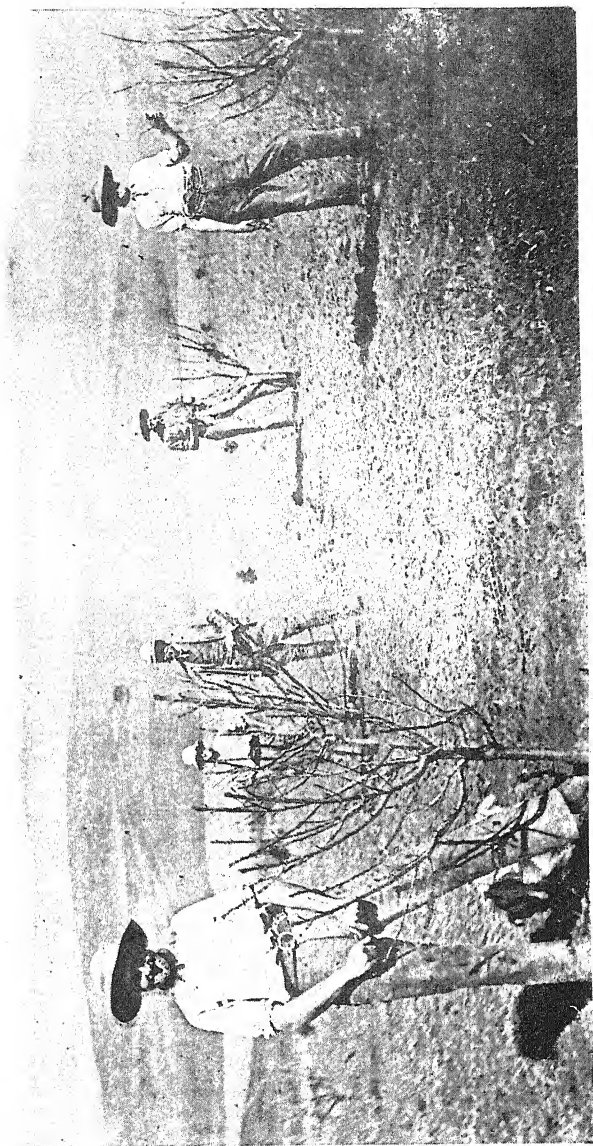
The second case occurred amongst cattle the property of Mr. North, of Northdene. When the outbreak of East Coast Fever took place at Northdene and the Umlaas Waterworks, some ten months ago, the infection

spread rapidly and in a short time killed practically all the cattle around Mr. North's property. His cattle, which consisted of stabled cows and some loose cattle in a paddock, remained free from disease until the 18th July, 1907, when cases of the disease appeared. In this case the infection was attributed to natives and others, who had been daily engaged in bush hunts over the infected veld, carrying infected ticks which gained access to the cattle and thus produced the disease. In support of this it was known that the boys came direct from these hunts to milk the cows, and while acknowledging that such a source was possible, it was necessary, in recording it, to be able to eliminate the possibility of cattle being the carriers of the infection which, Mr. Woollatt thinks, the following evidence fails to do. It was ascertained upon enquiry that an ox, the last animal belonging to the native Msazis, strayed into Mr. North's paddock. This happened in the middle of May. It was the last remaining animal of a herd the rest of which had died of East Coast Fever. It was immediately shot, and as its temperature was normal no harm could have resulted; but the point is, if an ox could stray into the paddock one of the animals in the paddock could have strayed out, or other sick cattle could have strayed in. The D.V. Surgeon reported on the 17th August that on inspection of Mr. North's fences he found these by no means cattle-proof, and the deaths were then occurring among the cattle in the paddock apart from the cows in the stable.

EAST COAST FEVER CURES.

"After a lull of several months cures for East Coast Fever are again being brought forward," says Mr. Woollatt, in his report, "accompanied as usual with condemnation of the Veterinary Department by certain sections of the public who appear to think that the former cannot be properly paraded before the public without the latter accompanying it. Notwithstanding statements to the contrary, my Department, particularly in Zululand and Vryheid District at the present stage, would probably welcome a cure more than anyone else, although the best of cures only lessens mortality and is frequently not the means of eradicating a disease, which is the aim of those who really have the future welfare of the country in mind."

Mr. Woollatt then proceeds to point out that East Coast Fever, like horsesickness, is a disease which lends itself particularly well to the apparent success of so-called "cures," which "cures" become converted into preventatives when their curative properties are found to be unsatisfactory. Neither of the above-mentioned diseases is directly contagious. In the case of East Coast Fever animals may run on infected veld for many months without becoming diseased, and when the mortality is high, if the apparently healthy animals are removed, the death rate is at once reduced considerably. These facts are excellent adjuncts to all cures or preventatives, Mr. Woollatt remarks, in the hands of those who do not recognise



PRUNING AT CEDAR A.
The Orchardist and Students.



them or who do not wish to. Up to the present the apparent success of any claimed cure or preventative has been entirely due to these facts, and not to any effect produced on the animals by the agent administered. "To those who appear to think that my Department endeavours to throw cold water on any cure brought forward," the P.V. Surgeon says, "I may say that we will assist loyally any individual who has any evidence to show at all that his claimed cure or prevention is of any practical value. The efficacy of any cure or preventative can be easily settled in a practical manner; but as up to the present, with two exceptions, all those who have thought themselves to be in the possession of such cures have required the Government to bear the whole expense of providing cattle, etc., and have been unable to produce any evidence of value showing their cures to have produced any practical results, the Government has so far rightly expected these individuals to bear proportion of the cost. Up to the present, we have not had sufficient faith in any cure to warrant additional expenditure; and I think it can be argued that if the individual who claims to have the cure has not sufficient faith to incur some small expense to demonstrate it, Government should not be expected to have that extra confidence to warrant the expenditure. It may be mentioned that we have had applications from numerous individuals, and if the principle of the Government bearing the expense had been established the expense incurred would have been considerable, and we can safely say that up to the present the results would have been nothing. In conclusion, although, as stated above, we should support anyone whose claimed cure is based on any practical results, yet we will not support in any way these so-called cures which have nothing whatever to support them. In such cases the reaction which sets in is only a matter of time, and those who have paid for the cures feel that they have wasted their money; and I think that all thinking men will agree that it is the duty of a Government Department to endeavour to protect the public in such matters rather than encourage a line of action which has every possibility of turning out to be a fraud.

"For the information of those who perhaps have not followed the course of East Coast Fever as closely as we have I may mention that from the outset cures have periodically been forthcoming, the farming community have paid out considerable sums of money to the finders of the so-called cures, and I can positively state that they have received no benefit whatever for the money which they have expended."

OTHER DISEASES.

Very little is reported of other diseases, mange, scab and lungsickness being apparently the most important.

Scab.—Forty-four fresh outbreaks occurred during the month; and 32 licenses were raised.

Lungsickness.—No fresh outbreaks have been reported. Two licenses were raised during the month. One outbreak occurred early in Septem-

ber in Alfred County, the infection coming from the Cape. Mr. Woollatt states that when the Cape Border was closed on account of the number of outbreaks which existed in that Colony, Alfred County still had communication with the Cape by means of cattle transport. This was done as under the East Coast Fever regulations the Umzimkulu River was the boundary and the Cape Authorities permitted ox transport from Alfred County. The public of Alfred County were warned of the danger of lung sickness. Since the outbreak no cattle are allowed to leave Alfred County for the rest of Natal, except slaughter cattle being taken direct by rail for immediate slaughter.

Crop Reports for August.

As far as our reports—the number of which has increased since last month's notes were written—enable us to judge, the rainfall in most parts of the Colony during August was practically nil.

With the exception of two or three districts, where a recurrence of the heavier frosts of the previous months seems to have been experienced, the abatement of the frosts continues, practically all the southern districts of the Colony now being free. Generally speaking, little injury was caused during the month, but our correspondent at Highflats reports that the heavy frosts experienced during the early part of the month did considerable damage to the young plantations of wattle, and much damage was done also by frosts to crops in the Babanango district. Also, in the New Hanover and Greytown districts about 2,000 acres of young wattles were frosted to the ground; and our Bulwer correspondent reports damage to potatoes left in the ground. Orange trees, too, he states, have been killed.

Farmers are now thinking of cultivating operations for the coming season. In several districts, however, through the want of rain the ground is too hard to plough, and consequently no crops have been planted. In some districts ploughing has been started, and in others—Himeville, for instance—mealie sowing has been commenced; and from St. Augustine's we get a report that early potatoes are being planted. In Newcastle, Utrecht, and other northern districts such cereals as wheat, barley and oats are reported to be looking very well. Our Seven Oaks correspondent reports that the prospects of the wattle bark crop are not as bright as last

year, and states that a considerable drop in the prices has taken place during the last few months. In the Mid-Illovo and Nel's Rust districts, however, the prospects are reported to be good. Our Bulwer correspondent reports that the wattle industry is now being commenced in the Polela district. In most districts of the Colony, according to our reports, the veld is looking well; and our Highflats, Vryheid, Van Reenen, Ingogo, and St. Augustine's correspondents are of opinion that the prospects of a good lambing season are excellent.

With regard to the fruit, our Durban correspondent remarks: "After one of the heaviest crops of citrus fruit ever experienced on the Coast, and even taking into consideration the quantity that has been exported, the financial result has been the worst, due principally to the fact that the Transvaal is producing nearly enough for its own requirements, and to the depression which is prevailing all over South Africa. With regard to the supply of bananas, I think the supply will be short of the demand, owing to the particularly severe and dry winter, as well as to the fact that a considerable quantity of land under bananas is 'giving out.' Fruit-growers appear to have given more attention to the cultivation of pine-apples, and provided that a remunerative market can be found for them in England and the Continent there appears to be a good future for this fruit." The fruit crop (peaches, plums, apricots, etc.), in many parts of the Colony promises well, judging by the amount of blossom on the trees, but it is, of course, too early yet to judge.

Our Bulwer correspondent reports that *Paspalum* grass is being tried as an experiment. He states, however, that it is thought by some farmers that the frosts in winter will be too much for this crop. A small quantity of tea is expected to be picked in the Mid-Illovo districts this season.

There does not seem to be much change in the conditions prevailing in the live stock market, though there seems to be a tendency towards an improvement. From the Imbizana, Richmond, Riet Vlei, Glencoe, and Babanango districts reports have come indicating a better state of things. The prices of eggs and poultry have been low in every part of the Colony, so far as our reports enable us to judge, whilst on the other hand the prices of milk and butter have been, generally speaking, good.

Our St. Augustine's correspondent says that donkeys are in great demand among the natives in his district for ploughing; and that these animals are being offered and accepted as *lobola*.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg, and other South African markets during the month of August-September, have averaged as follows:—

NATAL.

PIETERMARITZBURG.

The Market Master has furnished the following prices realised on the Maritzburg market during the month ended 15th September:—

Live Stock.—Fowls, 2s; ducks, 2s; turkeys, cocks 10s, hens 5s; rabbits, 1s 6d.

Animal Produce.—Butter (fresh), 1s 6d per lb; eggs, 10d per doz; cheese, 9d per lb; bacon, 6d per lb; ham, 9d per lb; pork, 5d per lb; lard, 7d per lb; hides, 7d per lb; honey, 6d per lb.

Vegetable Produce.—Buckwheat, 12s 9d per muid; beans, 18s per muid; earth nuts, 10s per muid; Japanese millet (grain), 4s 6d per 100 lbs; Kafir corn: mabele 10s per muid, geba 7s 6d per muid; mealies, 7s 4d per muid; sunflower seeds, 6s per 100 lbs; hay, 20s per ton; oats, £2 10s per ton; barley, £2 per ton; potatoes, 6s per muid; sweet potatoes, 2s 9d per muid; peas, 19s 6d per muid; amadumbe, 4s 6d per muid; bananas, 1s per 100; oranges, 1s per 100; naartjes, 1s 6d per 100; pineapples, 9d per doz; papaws, 2s 6d per doz; wood: cut 7½d per 100 lbs, uncut 5d per 100 lbs.

DURBAN.

Up to the time of going to press our usual report from Durban had not been received. The following prices, however, which were realised on the morning market on the 23rd September appeared in the daily press and are published herewith instead:—Bananas, 6d to 9d per 100; lemons, 3d to 6d per case; lettuces, 3d per doz; amadumbies, 4s to 4s 9d per bag; mandarins, 1s to 3s 6d per 100; naartjes, 1s to 4s per 100; oranges (Colonial), 9d to 2s 9d per 100; papaws, 6d to 1s 6d per doz; pineapples, 6d to 2s per doz; potatoes (round), 5s 6d to 10s per muid; eggs (fresh), 10d to 1s per doz; fowls, 1s to 2s 9d each.

TRANSVAAL.

Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg (representing the Farmers' Co-operative Associations of Cape Colony), reports with regard to prices realised on the Johannesburg market during the week ended 19th September:—

Live Stock.—Cows (milk), £15 to £40; oxen (slaughter), £10 to £15 7s 6d; oxen (dressed), per 100 lbs, £1 17s 6d to £2; pigs, 3½d to 4d

per lb live weight; sheep (slaughter lambs), 17s 6d to 22s 6d each; sheep (dressed), 5½d to 5¾d per lb; mules, £15 to £22; donkeys, £6 to £9; fowls, 2s to 3s; ducks, 2s 6d to 3s; geese, 5s 6d to 6s; turkeys: cocks 7s to 12s 6d, hens 5s to 7s.

Animal Produce.—Butter, 1s per lb; eggs: new laid 1s 6d to 2s, fresh 1s 3d to 1s 6d per doz.

Vegetable Produce.—Bran, 7s 9d per bag of 100 lbs net; beans (dry), 10s to £2 2s per bag of 200 lbs net; Kafir corn, 11s 6d to 12s per bag of 200 lbs net; lucerne (dry), 5s 6d to 6s 3d per 100 lbs; manna, 3s 6d per 100 lbs; mealies, 7s to 7s 9d per bag of 200 lbs net; oats (seed), 7s 6d to 8s per bag of 130 lbs net; Boer meal, 25s per bag of 200 lbs net; chaff, 4s per 100 lbs; potatoes, 10s to 13s 6d, (medium) 5s 6d to 9s 6d per bag of 160 lbs net; sweet potatoes, 6s to 9s per bag of 120 lbs net; forage, 3s 9d to 7s 6d per 100 lbs; turnips, 2s to 4s per bag; oranges, 2s to 6s per 100; naartjes, 2s 6d to 6s per 100; pineapples, 1s to 2s per doz.

CAPE COLONY.

The following information has been compiled from the latest available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 14th September) appearing in the *Cape Times*:—

Live Stock.—The demand for live stock weakened during the first two weeks of September. At the time of writing prime oxen could command a sale, but for sheep and pigs, which were offering freely, the market was very limited. The following prices were quoted:—Prime slaughter oxen, 36s to 38s 6d per 100 lbs dressed weight, Maitland; sheep, dressed weight averaging 50 to 54 lbs, 22s to 23s, Maitland; fowls: small 1s 2d to 1s 8d, medium 1s 9d to 2s 2d, large 2s 4d to 2s 10d; ducks, 2s 6d to 3s 3d; turkeys: cocks 5s to 9s 10d, hens 4s to 6s 3d; geese, 3s 6d to 4s 6d.

Animal Produce.—Butter (best), 1s 4½d wholesale, 1s 9d retail, per lb; cheese: Colonial Camembert 9s per doz, Colonial national cream cheese 4s 6d per doz; eggs: fresh 8s 6d per 100, not guaranteed 6s 3d to 7s per 100. Good Colonial butter and cheese were still in demand, but eggs remained weak.

Vegetable Produce.—The markets, during the week under review, were overstocked with potatoes, many of an inferior kind, but even those of a good quality could not be disposed of. Onions, however, were in demand. Forage remained steady, excepting oat-hay, which had fallen slightly. The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 lb—Caledon, firsts, 17s 6d to 17s 9d; Malmesbury, 18s 6d to 18s 9d; Moorreesburg, 18s 3d to 18s 6d; Porterville-road, 18s 6d to 19s.

Colonial oats, per 150 lb—Caledon, firsts, 7s to 7s 3d; seconds, 6s 9d to 7s; Moorreesburg, 7s 3d to 7s 6d; Malmesbury, 7s 6d to 7s 9d; main line, 8s 6d to 9s.

Colonial barley, per 150 lb—Moorreesburg, 8s to 8s 6d; main line, 8s 3d to 8s 9d; Caledon, 7s 9d to 8s.

Colonial rye, per 100 lb—Ccountry stations, 16s 6d to 17s; Kafir corn, per 200 lb, red 12s 9d to 13s, white 12s 6d to 12s 9d, ex stores, Capetown.

Bran, per 100 lb, 5s 8d to 5s 9d, ex stores, Capetown.

Mealies, per 200 lb—Natal yellows, 12s to 12s 6d; O.R.C., small yellows, 13s 3d to 13s 6d; Natal White Coast, 11s 9d to 12s; Eastern Province Germans, 12s 6d to 12s 9d; Eastern Province, mixed, 11s 9d to 12s.

Forage, per 100 lb—Colonial lucerne hay, 5s 6d to 5s 9d, ex stores, Capetown; Colonial oat-hay, 4s 2d to 4s 3d, main line stations; 3s 8d to 3s 10d, Moorreesburg and Malmesbury; Colonial fodder, 5s 6d to 5s 9d, ex stores, Capetown; Colonial common chaff, 1s 9d to 1s 10d, main line stations; 1s 8d to 1s 9d, Moorreesburg and Malmesbury.

Vegetables and fruit—Potatoes: first quality 11s to 12s 6d, second quality 7s 6d to 8s 6d, imported 14s, per bag; beans, 8s 6d to 10s per bag; onions: good quality 11s to 12s per bag, second quality 10s per bag, new green 2s per 100 bunches; green peas, fresh, 10s to 12s 6d per bag; beans, Natal and sugar, 37s 6d to 40s per bag; Cape lemons, 8d to 1s per box of 100 to 250; limes, 1s to 2s 9d per 100 (fair demand); bananas, 14s to 18s per case, choicest 18s to 21s per case; pineapples (E.P.), 6s to 10s per 100, few extra choice 2s per doz; oranges: small 1s 4d to 1s 9d per 100, medium 2s to 3s, large 4s to 7s, per 100; naartjes: selected 5s to 7s 6d, medium 2s 4d to 4s, per 100.

KIMBERLEY.

Messrs. Jas. Lawrence & Co., reporting for the week ended 14th September to the Bloemfontein *Post*, state, with reference to the Kimberley market:—

The market has been well supplied for the past week and prices remain unchanged. Mealies are very plentiful. Large demand for pure white Kafir corn. Oats and oat-hay have had a further decline in price. Seed barley enquired for. There has been a further advance in imported meals, and Colonials have also advanced in sympathy. Sound dry onions find ready sale. Potatoes slightly firmer. Eggs continue plentiful. Poultry fit for immediate killing in demand. Fresh butter inquired for. Large supply of oranges. Good general assortment of fresh vegetables. No alteration to report in the live stock market. No demand for pigs.

The following prices are quoted:—

Live Stock.—Oxen (good prime), 600 lbs upwards, £9 to £14; cows (good), £5 10s to £8; calves, 5½d per lb, dead weight; pigs (clean) 100 lbs, 3d, 3½d per lb, live weight; lambs, 30 lbs, 12s to 14s; hamels, 40 lbs to 45 lbs, 15s to 19s; Cape sheep (good), 15s to 19s; oxen (trex), £7 to £8; riding horses, £10 10s to £27 10s; draught horses, £10 to £25; mares, £10 to £25; fowls, 1s 6d to 2s 9d; ducks, 2s 9d to 3s 6d; turkeys, 4s 6d to 12s 6d.

Animal Produce.—Butter: fresh 1s to 1s 4d per lb, second quality 6d to 11d; eggs, 7d to 9d per doz; hams and bacon, 5d to 8d per lb.

Vegetable Produce.—Bran, 7s to 7s 6d per bag of 100 lbs; barley, 7s 6d to 12s 6d per bag of 163 lbs; sugar beans, 30s to 40s per bag of 203 lbs; chaff: Colonial 6s 6d to 12s 6d per bale, Colonial pressed 3s 3d to 4s per 100 lbs; forage (good) 6s to 6s 6d per 100 lbs; forage (inferior), 3s 6d to 4s 6d per 100 lbs; Kafir corn, South African, mixed, 8s 6d to 10s 6d; Kafir corn, white, 10s 6d to 14s; mealies: yellow Colonial 8s 6d to 10s per bag of 203 lb, white Colonial (hard) 8s to 9s 6d per bag of 203 lbs, mixed 7s to 9s; mealie meal: O.R.C. 9s to 10s 6d per bag 183 lbs; white 10s to 11s 6d per bag 183 lbs; oats (Cape), 10s 6d to 11s 6d per bag 153 lbs; lucerne hay, 4s 6d to 5s per 100 lbs; onions, 8s to 15s per bag 120 lbs; potatoes, 6s to 11s; tobacco: good 4d to 7d per lb, inferior 2d per lb; wheat, 17s to 20s per bag 203 lbs; oranges, 2s 6d to 6s per 100; naartjes, 2s to 3s per 100; pineapples, 1s to 2s per doz.

ORANGE RIVER COLONY.

BLOEMFONTEIN.

The following prices realised on the Bloemfontein market appeared in the Bloemfontein *Post* on the 17th September:—

Live Stock and Animal Produce.—Fowls, 2s to 2s 6d; ducks, 2s 6d to 2s 9d; turkeys, 3s 6d to 7s 6d.

Vegetable Produce.—Chaff, 4s to 5s per 100 lbs; Kafir corn, 9s to 10s per bag; mealies, 6s to 8s per bag; barley, 12s per bag; oat hay, 7s to 8s 6d per 100 lbs; bran, 8s per bag; potatoes, 5s to 10s per bag; onions 5s to 13s per bag; oranges, 2s to 5s per 100; naartjes, 2s to 4s 6d per 100.

WOOL AND MOHAIR.

Messrs. Dunn & Co., Durban, in the course of their report on wool and mohair, state:—

The prospects for the coming wool season are good, and buyers here have orders for all good light wools. On this week's sales there was a small parcel of five bales superior O.R.C. new season's clip offered and sold at 8½d, this being very light and clean. At present there are only oddments coming forward, which meet with good competition at firm prices.

Newcastle District.

Long fine clean, 12 months, 8½d to 9d; ordinary ditto, 7½d to 7¾d; fine clean, 9 months, 8d to 8¾d; short ditto, 7½d to 7¾d; heavy faulty, 5½d to 6d.

Vryheid District.

Superior long fine, 12 months, 7½d to 8½d; good long ditto, 7d to 7¾d; ordinary ditto, 6½d to 6¾d; short clean, 6—8 months, 6½d to 6¾d; poorer lots 5½d. to 6d.

Harrismith and Vrede District.

Good light, 12 months, $8\frac{1}{4}$ d to 9d; average length ditto, $6\frac{1}{2}$ d to 7d; short clean, 6—8 months, $6\frac{1}{2}$ d to 7d; heavy inferior 12 months, 6d to $6\frac{1}{2}$ d; earthy heavy, $5\frac{1}{2}$ d to $5\frac{3}{4}$ d; average fair ditto, 6d to $6\frac{1}{4}$ d.

NATIVE WOOLS.

Basutoland, $6\frac{1}{2}$ d to 7d; East Griqualand, 7d to $8\frac{1}{4}$ d.

MOHAIR.

The market for this staple is firm for good long clean quality; short mohair is not wanted unless at low rates.

We quote Super long sorted O.R.C. and Transvaal, 13d to $13\frac{1}{2}$ d; fair average, $11\frac{1}{2}$ d to 12d; mixed, $10\frac{1}{2}$ d to 11d; coloured and kempy, 7d to $8\frac{1}{2}$ d.

HIDES.

Super sun dried, 7d to $7\frac{1}{2}$ d; damaged 6d to $6\frac{1}{2}$ d salted, $6\frac{1}{2}$ d to $6\frac{3}{4}$ d.

SHEEP SKINS.

Sound skins are quoted at $6\frac{1}{2}$ d to $6\frac{3}{4}$ d; damaged, 5d; average $5\frac{1}{2}$ d to $6\frac{1}{2}$ d; mixed parcels, $4\frac{1}{2}$ d to $5\frac{1}{2}$ d.

The Oversea Maize Market.

THE POSITION IN AUGUST.

THE following information regarding the oversea maize market has been compiled from *Beerbohm's Evening Corn Trade List*.

"There can be little doubt that there is an enormous demand on the Continent for maize," says the *List* of August 2nd, "and in this country, too, we know that maize sells in the country districts with unwonted freedom, other feeding stuffs being either very scarce or very dear, or both, and this state of things will no doubt continue for some time to come. With comparatively little remaining to be shipped from America during the next five months, and with the prospect of a much smaller crop in that country than last year, it is tolerably clear that the future of maize prices remains in the hands of shippers in South-Eastern Europe, because it is highly improbable that Argentina maize will at any time be aggressive in quantity this year. All things considered, and judging maize in its price relation to other articles, it is not unlikely that we have recently seen the lowest price for some time, just as we have, no doubt, now passed through the period of the largest shipments." During the week ended 2nd August 22s. $7\frac{1}{2}$ d. had been accepted for La Plata steamer arrived; 22s. 9d. had been paid for a steamer just sailed, and was obtainable for August-September shipment; 23s. 6d. had also been paid (per 492 lbs.) for Foxanian steamer about loading, and for a steamer of Odessa, August-September.

During the week ended 9th August there was a decided improvement in the demand for maize, and prices improved 6d. to 9d. per quarter, partly owing to very unfavourable reports regarding the growing Roumanian crop, and partly to the growing impression that the next American crop will be a relatively small one, although there was some improvement in July. In some States the average promise is nearly 20 per cent. below last year's, and there is little doubt, it is thought, that the season has been an unfavourable one for this crop. Some authorities talk of a probable crop of 2,500 million bushels, but others expect 2,700 millions; last year 2,927 millions were reaped, 2,708 millions in 1905, and 2,467 millions in 1904, according to the official returns, but the American exports in the present season have been actually smaller than in either of the two previous years. With regard to the Roumanian crop, the *Corn Trade List's* Galatz correspondent, writing on 1st August, stated that the drought had been so serious that it was feared that half the crop was lost. "But apart from these questions of crop outlook," comments the *List*, "it is tolerably clear that the consumptive demand for maize is extremely large this season, especially on the Continent. . . . But maize being by far the cheapest 'feeder,' the demand for it seems to adjust itself to the supply."

With regard to Argentina, it was stated early in March that the crop would not exceed 8,500,000 qrs., and that only about 1,500,000 qrs. would be available for export. Other advices, however, inclined to the belief that four to five million quarters would be available, compared with 13 million quarters in the previous season, and this estimate, the *List* thinks, bids fair to be nearer the truth.

There was an active demand for maize during the week ended 23rd August, and 9d. to 1s. advance was quoted.

Telegrams from Roumania during the same week gave a very unfavourable idea of the prospects of the growing crop; it was even estimated that the total yield might not exceed 35 per cent. of last year's, which reached 16,000,000 quarters, and left a surplus for export of 8 to 9 million quarters, of which about 6 million quarters had already been exported. "Unless the crop outlook improves considerably, therefore, it is easy to understand," comments the *Corn Trade List*, "that what remains of the old crop will be held with much tenacity, because it may possibly be wanted to supplement the new crop, seeing that the home requirements of Roumania amount to about seven million quarters. With the contingency of a crop failure in that country, and with a much smaller prospective crop in America than last year, buyers of forward maize have naturally felt increased confidence in prices."

The Hungarian crop, according to the official report for August 15th, promised the record yield of 20 million quarters, against 19 million quarters last year, but since mid-August there have been serious complaints of damage by drought in many districts. The Italian crop is reported to be

a more or less serious failure, owing to the continued dry, hot weather. The Bulgarian crop, like the Roumanian crop, is also reported to be a failure this season, whilst in the most important maize-growing districts of Russia much damage has also resulted from an insufficiency of rain. From America reports were rather favourable during the week ended 23rd August; "but it is significant," comments the *List*, "that an important State like Kansas should report an average condition on August 1st of only 74, against 88 last year."

There was a further 6d. advance on maize values during the week ended 30th August, with quite a good demand, although this slackened towards the end of the week; 24s. 6d. to 24s. 7½d. was paid for La Plata afloat, and 24s. 9d. was bid for September-October shipments. At the same date last year 19s. 9d. to 20s. was the value. The American maize crop is seriously complained of in the principal maize-growing States, and the decided failure of the oats crop in that country naturally affects maize. Continued unfavourable reports regarding the Russian crop were also to hand at the time of writing, so that there is a prospect in the more distant future of maize supplies falling off. In parcels for London prices had eased off somewhat during the week under review, 24s. 10½d. c.i.f. having been accepted for Odessa afloat, and 24s. 10½d. for mixed American, August shipment.

The general statistical position of maize carried up to date (30th August) was as follows:—

	1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	835,000	1,110,000	1,240,000
" " Cont.	740,000	1,030,000	1,600,000
Imports into U.K. for the 34 weeks ending Aug 24	8,012,800	7,083,900	6,976,300
Visible supply in U.S. (<i>Braistreet's</i>)	1,026,300	627,900	977,900
	1906-7	1905-6	1904-5
American crop	340,000,000	316,000,000	285,000,000
	1907.	1906.	1905
New York Spot	67c	57½c	60½c
Mark Lane, Mxd. Am. ex-ship	25'3	...	22'9

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	3,095,000	3,730,000	3,319,000	5,336,000	3,678,000	4,886,000
Argentina	2,035,000	1,300,000	3,786,000	3,058,000	4,293,000	2,301,000
Russia	1,210,000	1,815,000	160,000	226,000	200,000	439,000
Danule, etc.	1,785,000	3,360,000	365,000	1,055,000	124,000	139,000
Total	8,125,000	10,205,000	7,630,000	9,675,000	8,295,000	7,765,000

* Includes shipments for orders.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of August, 1907:—

Name of Colliery.	Average Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			
	E.	N.	L.	E.	N.	L.	E.	N.	L.	Tons. Cwt
Natal Navigation ..	32	77	222	19	246	213	—	3	1	24,502 16
Elandslaagte ..	16	23	267	17	187	470	1	2	1	17,197 15
Glencoe, Natal ..	13	72	14	11	473	80	—	—	—	16,152 3
Dundee Coal Co. ..	10	10	192	10	29	302	7	7	27	16,052 10
Natal Cambrian ..	13	43	141	9	287	92	3	4	2	13,706 6
Durban Navigation ..	29	192	62	10	315	57	—	—	—	13,238 9
South African ..	10	11	91	11	229	46	5	31	48	12,632 1
St. George's ..	17	97	115	12	179	160	4	13	—	10,755 0
Newcastle ..	8	42	24	6	269	5	2	6	—	7,109 10
Ramsay ..	2	14	40	4	140	86	2	5	8	3,067 11
Natal Steam Coal Co. ..	1	50	3	2	170	2	—	3	3	3,539 15
Central ..	4	65	10	6	243	11	—	—	—	3,304 17
West Lennoxton ..	5	1	63	2	25	103	—	—	—	3,127 19
Takana (Natal) ..	3	15	18	2	49	46	1	4	2	1,871 13
Zululand† ..	6	81	—	2	99	—	7	15	—	1,197 0
Woodlands ..	2	7	5	1	9	5	—	—	—	280 0
Vryheid ..	1	4	—	—	2	—	—	—	—	16 0
Dumbi Mountain ..	1	1	—	—	—	—	—	—	—	6 10
Nooitgedacht ..	—	2	—	1	2	—	—	—	—	6 0
Totals	173	807	1,369	123	2,944	1,679	32	93	92	147,834 16
Corresponding month, '06	156	725	1,252	121	2,290	1,559	58	253	115	104,665 15

* Cost charged to Capital Account.

† Includes July Return.

‡ July Return.

Maritzburg,
9th September, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of August, 1907:—

	Tons.	Cwt
Bunker Coal* ..	67,933	9
Exported to:—		
East London ..	4,994	9
Algoa Bay ..	5,296	9
Knysna ..	146	19
Mossel Bay ..	348	0
Cape Town ..	11,532	19
London ..	5	10
Mauritius ..	1,995	15
Port Phie ..	3,060	17
Beira... ..	56	17
Bombay ..	1,201	14
Total ..	96,572	18

* Including H.M. Warships.

Custom House, Port Natal,
2nd September, 1907.

A. D. C. AGNEW,
for Collector of Customs.

Manures on the Natal Market, Season 1907.

NAME OF MANURE.	PHOSPHORIC ACID.										Estimated Total Value of Manure per Ton (2,000 lbs.)	Price asked per Ton of 2,000 lbs. f.o.r. Durban.				
	NITROGEN.		Water Soluble.				Citrate Soluble.		Citrate Insoluble.				TOTAL.		POTASH.	
			Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.			Per Cent.	Value in One Ton of Manure.		
<i>Nitrogenous :</i>		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		
Nitrate of Soda	15.51	12 5 7	...	...	...	...	...	...	...	...	...	...	...	12 5 7	12 4 6a
<i>Mainly Phosphatic:</i>																
Superphosphate (High Grade)	...	...	17.50	4 17 9	1.52	0 6 4	0.22	0 0 7	19.24	5 4 8	...	...	...	5 4 8	5 4 6b
Basic Slag	...	...	...	...	8.65	2 3 3	9.31	1 14 11	17.96	3 18 2	...	...	...	3 18 2	3 19 6a
<i>Potassic :</i>																
Kainit	...	...	...	...	...	...	...	...	...	...	...	12.65	2 19 0	2 19 0	2 17 6a
<i>Complete :</i>																
Potato	2.68	2 1 2	7.52	2 2 0	3.35	0 14 0	2.48	0 6 10	13.35	3 2 10	3.71	0 17 4	6 1 4	7 12 0b		

NAMES OF SELLERS.—a Steel, Murray & Co. b J. Raw & Co.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of August, 1907

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rain- fall in 1 day.		Total for Year from July 1st, 1907.	Total for sameper'd from Ju y 1st, 1906.	
	Maximum.	Minimum.					Fall.	Day.			
Observatory ..	77.3	55.2	87.6	45.7	01	1	01	31st	17	55	
Stanger ..	79.7	51.6	96	45	00	1	00	31st	107	49	
Vernham ..	82.0	53.1	93	42	Nil	—	—	—	25	25	
Greytown ..	77.1	39.5	83	27	Nil	—	—	—	19	24	
Newcastle ..	77.7	40.0	86	29	Nil	—	—	—	Nil	Nil	
Ndwedwe ..	72.3	56.7	84	48	Nil	—	—	—	45	56	
Estcourt ..	70.5	35.6	85	28	Nil	—	—	—	00	Nil	
Mid-Illovo ..	77.6	52.2	93	39	03	1	03	31st	50	30	
Port-Shepstone..	77.0	52.1	92	43	Nil	—	—	—	89	35	
Umzinto ..	76.3	52.5	79	50	Nil	—	—	—	40	35	
Richmond ..	78.3	43.0	91	3	Nil	—	—	—	49	56	
Maritzburg ..	76.6	36.3	91	31	Nil	—	—	—	Nil	01	
Howick ..	72.3	46.3	91	24	Nil	—	—	—	34	19	
Camperdown ..	72.3	46.3	91	37	Nil	—	—	—	12	22	
Dundee ..	77.3	45.6	92	36	Nil	—	—	—	Nil	Nil	
Weenen Gaol ..	81.7	32.7	90	25	Nil	—	—	—	Nil	Nil	
New Hanover ..	78.7	39.1	89	30	Nil	—	—	—	29	36	
Nongoma ..	78.0	48.2	89	39	Nil	—	—	—	Nil	24	
N'Kandhla ..	72.6	42.5	79	34	Nil	—	—	—	27	70	
Nqutu ..	74.3	46.9	82	33	Nil	—	—	—	00	07	
Mtunzini ..	78.2	43.8	92	33	10	1	10	9th	192	—	
Mahlabatini ..	80.9	46.5	91	42	Nil	—	—	—	Nil	50	
Melmoth ..	78.3	50.7	92	39	Nil	—	—	—	06	50	
Umbono ..	80.1	51.3	90	50	01	1	01	9th	15	41	
Empangeni ..	79.5	50.5	91	40	07	1	07	10th	72	172	
Point ..	—	—	—	—	Nil	—	—	—	32	101	
Charlestown ..	70.7	33.9	79	18	Nil	—	—	—	Nil	Nil	
Utrecht ..	86.2	27.1	95	15	Nil	—	—	—	Nil	—	
Vryheid ..	81.3	44.5	92	35	Nil	—	—	—	Nil	Nil	
Amatikulu ..	80.9	50.2	97	41	Nil	—	—	—	29	124	
Bulwer ..	—	—	—	—	Nil	—	—	—	22	—	
Umbizana ..	—	—	—	—	00	2	00	11&29	1' 3	—	

Meteorological Observations taken at Private Stations for Month of August, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain- fall in one day.		Total for Year from July 1st, 1907.	Total for same period from July 1st, 1906.	
					Fall.	Day.			
Branhholme	—	—	Nil	—	—	—	0.71	0.60	
Adamshurst (Wm. Adams)	92	35	Nil	—	—	—	0.07	0.27	
Hilton	87	31	Nil	—	—	—	0.23	0.31	
Cedara—Hill	85	27	—	—	—	—	0.13	0.07	
Vlei	81	23	—	—	—	—	0.15	0.07	
Winkel Spruit	87	44	—	—	—	—	1.64	0.23	
Giant's Castle	72.4	39.1	Nil	—	—	—	0.63	Nil	
Weenen	87	25	—	—	—	—	—	Nil	
Mount Edgcombe (Natal Estates)	96	45	0.03	1	—	—	0.62	0.27	
Corubia	—	—	0.01	—	—	—	0.6	5.34	
Milkwood Kraal	—	—	0.04	—	—	—	0.51	1.49	
Blackburn	—	—	0.04	—	—	—	0.35	4.31	
Saccharine	—	—	0.02	—	—	—	0.49	2.30	
Equeefa (W. Hawksworth)	95	47	Nil	—	—	—	0.58	0.34	
Umzinto, Beneva	—	—	Nil	—	—	—	0.13	0.13	

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith	Scab	P. Nicholson	Nicholson's Nek
		"	G. J. McDonough	Waterford
		"	W. Anderson	Netherby
		"	Junze	Rosboom
		"	Mapelwana	Roodepoort
		"	W. M. Buys	Ruit Kuil
		"	J. J. Geldenhuys	Blauw Bank
		"	F. Colling	Klipdal
		"	E. T. Hyde	Hinsley
		"	I. J. M. Buys	Ruit Kuil
		"	Talwant	Twijhaar
		"	J. Stevens	Schoemansdal
		"	H. O. Hyde	Allen Park
		"	H. N. Nel	Catharine
		"	Ingetenga	Roodepoort
		"	Mabin'la	Tijhaar
		"	J. van de Bosch	Ruther Glen
J. R. Cooper	Nkanihla & Nqutu	"	Amangayehlezyo	Mangene
		"	Kalanaana	Nqutu
		"	L. Nene	"
		"	L. Rhega	Dalala
		"	T. Nxumalo	Macebo
		"	Mkungeni	Jojoeni
		"	A. Mbala	Blood River
		"	Vinuvie Libuna	Nkandi
		"	Luhlenia Ka etc.	Magala
		"	Sotshata Ka	No dweni
		"	Strinert Ka Yabya	Tilizi Hill
		"	Liyo Ka Norhayi	Mapaswaneni
		"	Komana Ka	Siluyela
		"	Makaskela	"
		"	Hlanganiza Ka	Nigasini
		"	Ngcongcoya Ka Pepo	"
S. A. Brown	Underberg	"	J. A. Stone	"
		"	T. de C. Arbuckle	Kerridge
		"	B. Phipson	Strathemphell
		"	M. Fraser	Winterhoek
		"	R. C. Gold	Woodend
		"	J. R. Royston	Greenend
		"	F. van Wyke	Silburn
		"	F. A. Hathorn	Sauguana
		"	T. Palfruman	Slogoma
		"	H. J. Hattiz	Servitude
A. B. Koe	Portion of Estcourt	"	J. J. B. Cooke	Estcourt
		"	Sclander Bros.	Kelvia
		"	J. van der Merwe	Excelsior
A. J. Marshall	Dundee	"	R. J. du Bois	Giba
		"	J. W. de Bruyn	Rooifontein
		"	C. M. Vermaak	Paddock
		"	J. P. Nel	Ka-nuscliffe
		"	A. C. Vermaak	Sigtuna
		"	T. C. Vermaak	Harriotsdale
		"	H. Whysall	Grantham
E. Varty	Western Unvoti	Scab	W. J. Slatter	Holm Lacy
		"	C. A. Charlwood	Craigieburn
J. J. Hodson	Ptn of Lion's River	"	R. Spiers	Moyen
		"	W. Willson	Thornton House
		"	W. A. Dales	Gowrie
		"	G. Woodhouse	Halliwel
		"	G. H. Burgmann	Boschhoek
R. Mayne	Krantzkop	Lungsickness	Magamganse	Loots Hoek
		"	Uqupu	Myoniezwe's Locat'n
		"	Ndabane	"
		"	S. Johnson & Co.	Inadie Store
		"	Ndabane	Myoniezwe's Locat'n
		"	Natyes	Myoniezwe's Locat'n
		Scab	S. C. Van Rooyen	Small Hoek
		Lungsickness	Amosi	"

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—continued.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. H. Ball	Weenen	Scab	L. C. Kinsman	Mount Moriah
			Deya	Lilyfontein
			Vunyo and others	Elena Berg
			Gundane	Gretna Green
			Kwinkwe	Belle Vue
			Tshoboso	
			C. Strapp	Lilyfontein
			T. J. Van Rooyen	Belle Vue
G. Daniell	Vryheid		L. J. & T. C. Louter	Waterfall
			Nkanyeze	Mooiplaas
			Hlabalaw	Nootgeducht
			P. H. Tredoux	Bellvue
			Myamana	Wel evrede
			D. Coetzee	Doornhoek
			Mabekashea	Nooitverwacht
			Fumawayo	Nooitgeacht
			J. V. Grening	Hartebeestelaagte
			Maboshwa	Onverwacht
			Molite	Beaufort
			Mpundhla	Onverwacht
			B. Balladen	Schaapkopje
			Zimbata	Noitgedacht
R. Mayne	Eastern Umvoti	Lungsickness	C. van Rooyen	Boschfontein
		Scab	Nkabi and others	Loots Hoek
			J. A. Nel	Oakland
			F. W. Spencer	Impanza
J. Button	Portion of Estcourt		G. J. Maritz	Fair View
			J. J. Marais	Malan Spruit
			C. Groom	Springvale
			W. McTear	Down Lands
E. Parkinson	New Hanover		Ndabeni and Jim	Locat on
			Chief Gwaimana	
			W. J. Dickens	Langer Farm
A. Hair	City and Umgeni		Umsu u	Zwaartkop Location
			Lutye	
			Ndane	Bishopstowe
D. M. Pfaff	Utrecht		P. Pretorius	Geluk
			Major and others	Spartlespruit
			Nkanda	
J. Stewart	Bergville		J. W. Mann	Castle View
			H. Jackson	Lytton
			A. Wright	Rhenosterfontein
			J. W. Stewart	Bergville
R. Wingfield Stratford	Newcastle		G. W. Thomas	Kingsdon
			D. Keay	Churnwood
			J. Havemann	Flaklaagte
			J. H. Muller	Leyden
			G. Friend	Lilydale
J. G. Speirs	Impendhle		Pind, Vete & Sobuon	Furth
A. Brown	Polela		Mahlali	Stoffletown
			F. J. Livingstone	Fernbank
L. Trunor	Harding	Lungsickness	Madunckana	Tridale
C. T. Vaughan	Pauplietersburg	Scab	G. C. Viljoen	Makaske Kop
			J. Potgieter	
			G. J. O. Viljoen	Rondekoppie
			G. J. Combrink	Paapkuilvlei
			H. J. Potgieter	Zuchkraal

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Meleli	Polela, Location No. 2
Mboyea	Bergville.	Genegwa	
Nseleni	Markwa Mountain.	H. Wilkins	Vryheid, Little
Abbott Bros.	Highlands.		Hlobome
J. Raw & Co.	Umgeni		

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned stock on the dates specified:—

On the 2nd October:—

Acton Homes.—Six goats, three white kapaters, two white ewes and one red ewe; all have long slit at the end of each ear.

Colenso.—(1) Brown filly, about 12 months old, both hind feet white, star on forehead (reported by Hans M'Duling, Chieveley, as running on the farm "Hill Grove, and too wild to be driven to the Pound). (2) Red ox, white face, long tail, piece out of right ear, branded indistinctly on right hip, looks like C.W. (3) Black ox, little white on hind quarter and belly, piece out of right ear, branded indistinctly on right hip, high up, looks like O.C.

Dundee.—Two half-bred Merino ewes, branded 3 or D right side; two lambs at foot.

Impendhle.—(1) Grey ewe goat, with grey kid, no brands or ear marks. (2) Grey ewe goat, with black and white kid, no brands or ear marks.

Krantzkop.—Dark brown gelding, aged, branded, looks like half-moon. Probable value, £6. Running on Mr. W. de Waal's farm "Elandskop," Krantzkop, and reported too wild to be driven to the Pound.

Mountain View (Newcastle Division).—Grey gelding, about 7 years, 14½ hands, no visible brand is.

New Germany.—White sow, ears cut.

Nqutu.—Eight Kafir sheep, one with left ear cut off, others with half-moon cut out behind right ear, very scabby.

Umsinga.—(1) Seven sheep, four black and three brown, Kafir sheep, no brands or marks. (2) Nine goats, two grey, two brown, and five black, Kafir goats, no brands or marks.

Utrecht.—Bay pony, black points, height about 13.2, age 6 years, no marks or brands, value about £8.

Woodstock (Bergville Division).—Brownish black sheep, ewe, branded J.A. on right shoulder, nick out of back of right ear, also slit in same, white V on face, with brownish black lamb at side.

On the 16th October:

Creighton.—(1) Black ewe goat and kid. (2) Black-and-white goat.

Estcourt.—(1) Red cow, branded S.A. Impounded by G. W. Linfoot, Estcourt, 20th August, 1907. (2) Six brown Kafir sheep. Impounded by J. Oates, Riversdale, 15th August, 1907. (3) Two Kafir goats, brown and white. Impounded by T. E. Woods, Knowle, Enlensdale, 16th August, 1907.

Finchley (Ixopo Division).—(1) Yellow ox. (2) Red ox, hang horns. Both oxen are branded with a large W on right hip. (3) Black pig, sow, four white feet.

Grevtown.—Running on Mr. W. J. Slatton's farm, "Holme Lacey," and reported by the Natal Police as too wild to be driven to the Pound:—(1) Black mare, aged, about 14.1 hands high, left hind foot white, branded on right buttock P.V. (2) Black filly, about two years old, white star on forehead, hind feet and left front foot white, no brand; or marks visible; above mare's foal.

Impendhle.—Six Angora ewes, earmarked as follows: Two with swallow tail in both ears, notch in left ear; one with slit and hole in left ear, tip off right ear; one with notch in left ear, and tip off left ear; two with notch in left ear. These goats were found in the possession of a native, and impounded by the Natal Police.

Krantzkop.—Black-and-white he goat. Impounded by Natal Police. Found amongst the goats of Native Gigaba. Owner supposed to be a native. Probable value 10s.

Mooi River.—(1) Light red cow, indistinct brand on near hind leg. looks like O or 8, about seven years old. (2) Black cow, little white on belly and both hind feet, small spot on forehead, indistinct brand on near hind leg, looks like O or 8; about ten years old. (3) Running on Mr. A. C. Thomson's farm, Nottingham Road, on west of line: Red-and-white cow, no brands, about five years old.

Mountain View (Newcastle Division).—Grey gelding, no visible brand, about eight years old, 14 hands high.

Redmain (Ingogo).—Ram, very old, no brands, one eye, one horn. Probable value, 5s. Impounded on the 9th September, 1907, by F. K. Panzera, Mission Mills.

Weenen.—Grey ewe goat, about two years old, no marks (running on the farm "Middlerest," and reported by Mr. P. J. van Rooyen, J.P., to be too wild to be driven to the Pound).

Woodstock (Bergville Division).—(1) Dark chestnut mare, long tail and mane, slight star on forehead, branded S on right hip. (2) Dark chestnut stallion colt, rising two, foal of the above, branded S on right hip. (3) Grey mare, long tail and mane, branded S on right hip.

On the 6th November:

Colenso.—Greyish-black colt, about two years old, white patch on forehead. Reported by Messrs. Cooke Bros., "Cypherfontein," Chieveley P.O., as running on their farm and too wild to be driven to the Pound.

Pietermaritzburg.—(1) Large red Madagascar ox, splashes of white under belly and flank, slits out of both ears, very long upright horns, indistinct brand on near quarters, looks like]—[. Impounded from Manderston. (2) Three goats, white ewe, with yellow head, black-and-white kid at foot; also black ewe. Impounded from Haynes' Drift.

Mr. B. Theunissen has been appointed Keeper of the Pound at Somkele, Hlabisa Division, *vice* A. Dornwell, deceased. A pound has been re-established at Vryheid, to which Mr. J. Hoatson has been appointed Keeper. A pound has also been established at Qudeni, with Mr. P. E. Titlestad as Keeper.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are:—

Cattle per head ... 1s., with a minimum of £3 per killing space per month.

Sheep ... 1½d. each.

Pigs... 3d. "

Chilling and Freezing Beef, 1st week ... 1s. 3d. per qr.

" " 2nd " ... 1s. "

" " Remaining weeks ... 9d. "

Sheep " ... per week ... 3d. "

Pigs ... " ... 6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room:—

Cattle, per head ... 4s. each (including abattoir fee).

Sheep ... 6d. "

Pigs ... 1s. " up to 200 lbs.

" ... 1s. 6d. each, over 200 lbs. & up to 300 lbs.

" ... 2s. " over 300 lbs.

W. A. DEANE,
Minister of Agriculture.

Department of Agriculture, Maritzburg,
9th April 1907.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith R. 2; Babanango, O. 2.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustani, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

101a.—A destitute boy of 17 years of age, and at present living on charity. Said to be strong and healthy and one who should be able to make himself useful on a farm.

No. 102.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

103a.—30 years of age, desires employment on tea estate. Has 3 years' experience in Ceylon and understands thoroughly, he states, the cultivation and manufacture of tea. Also kept the estate books.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

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WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. O. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cantherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortlepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Biammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Purchase of Tree Seeds.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Forester, Cedara.

E. R. SAWER,
Director, Experiment Stations.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests,

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

W. A. DEANE,
Minister of Agriculture.

24th September, 1907.

Steam Ploughs.

APPLICATIONS are invited for the services in the various districts of the Colony of the Steam Ploughs recently ordered by the Government.

Applicants should state clearly the position of their farms, and the total acreage required to be ploughed.

The charges will, for the present, be at the rate of, approximately, 10s. an acre in the Midland and Upland Districts of the Colony, and 15s. an acre in the Coast Districts; but the Government reserves to itself the right to vary these charges later on when experience has been gained as to the actual cost of working.

Preference will be given to those districts affected by East Coast Fever, and, again, to those from which the greatest number of applications are received.

Applicants will be advised, as soon as possible after the ploughs come to hand, whether the Government will be able to undertake the required ploughing, and when the ploughs are likely to be available.

E. T. MULLENS,
Secretary, Minister of Agriculture.

Department of Agriculture, Pietermaritzburg,
4th September, 1907.

Offers are invited for Two 6-Furrow Spalding-Robbins, Stump-Jumping Disc-Ploughs for Steam Traction. These have had little use, and the frames are as good as new, while the Ploughs were fitted with new discs last season. Landed cost of these was £56 each at the Point. Approximate weight, 2,000 lbs.

E. R. SAWER,
Director, Experiment Stations, Cedara.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

- No.
- 1.—“Notes on Fruit Culture,” by Claude Fuller. [1902]. (*Out of print*).
 - 2.—“Manures on the Natal Market, 1902” by A. Pardy. [1902].
 - 3.—“Insects in an Important Role,” by Claude Fuller. [1904]. (*Out of Print*).
 - 4.—“Manures on the Natal Market, 1903” by A. Pardy. [1903].
 - 5.—“Weed Circular,” by Claude Fuller. [1905].
 - 6.—“Manures on the Natal Market, 1904,” by A. Pardy. [1904].
 - 7.—“Tree-planting in Natal,” by T. R. Sim. [1905]. (*Price 2s. 6d.*)
 - 8.—“Agricultural Co-operation,” by E. T. Mullens. [1905]. (*Out of Print*)
 - 9.—“Potato Culture” by A. N. Pearson. [1905].
 - 10.—“Manures on Natal Market, 1905,” by A. Pardy. [1905].
“Agricultural Statistics, Natal, 1904-5.” [1906].
 - 11.—“East Coast Fever,” by S. B. Woollatt. [1906].
 - 12.—“Manures on Natal Market, 1906,” by A. Pardy. [1906].

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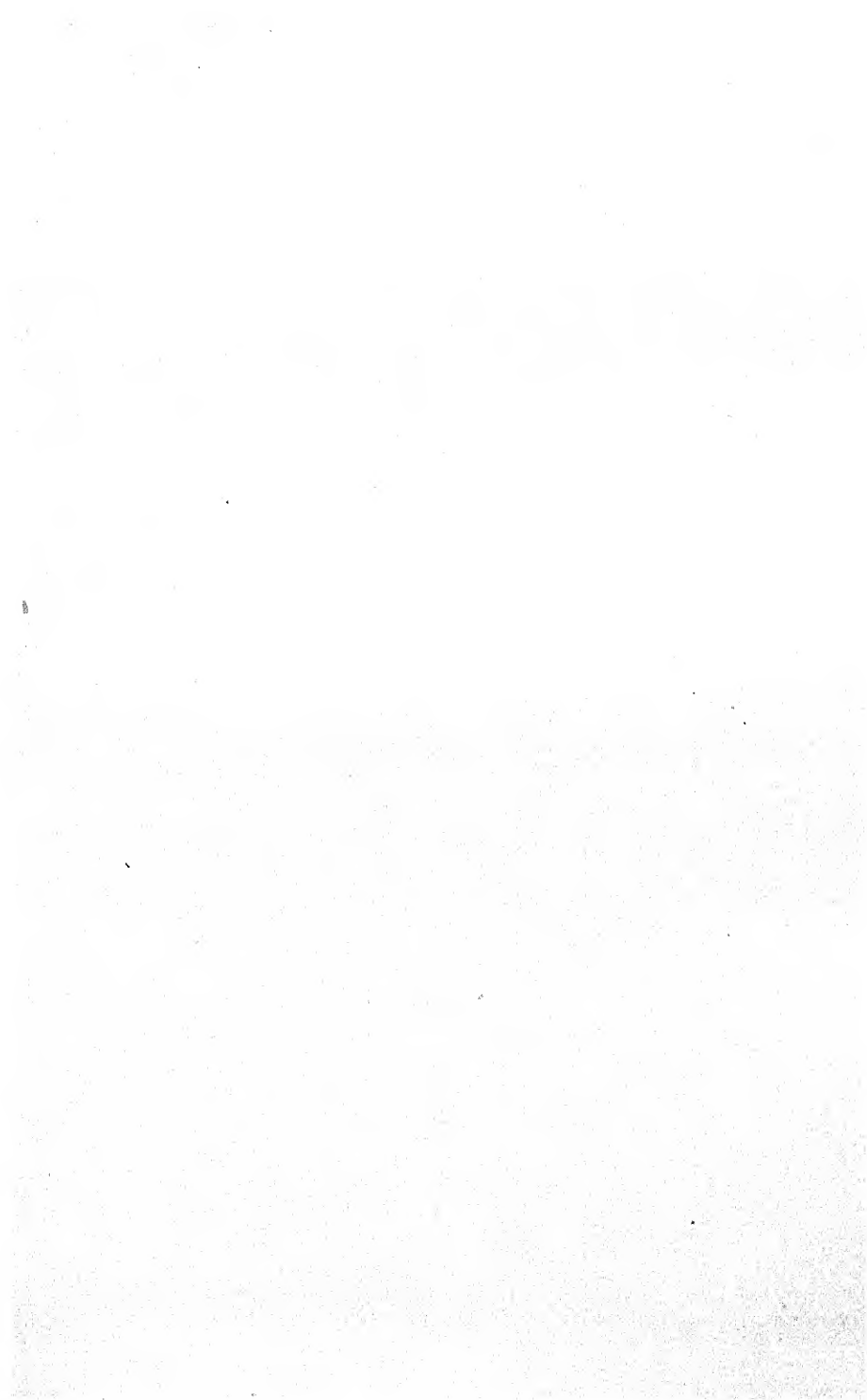
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SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.



Our Illustrations.

OWING to failure on the part of the firm entrusted with the preparation of the process blocks for the *Journal* to supply this month's blocks up to the time of going to press, we are regrettably compelled to allow the *Journal* to appear this month without the usual illustrations.

The blocks which were to have appeared in this issue will appear in next month's *Journal*, in addition to the usual number.

Natal Agricultural Journal and Mining Record.

The Ham and Bacon Industry

WE commend to the attention of our readers the following interesting paragraph taken from the *B. and S.A. Export Gazette*, apropos of the project to start a ham and bacon factory in the Camperdown district:—

Though much has been heard of late years concerning the feasibility of establishing bacon curing factories in various parts of South Africa, very little of a practical nature has been done, and in this branch at any rate the import trade remains unchallenged. During last year the Cape Colony alone imported bacon and hams to a value of nearly £100,000, and the trade with the whole of South Africa reached a sum of no less than £203,194, of which the United Kingdom supplied 81 per cent. Even more striking are the figures for the present year, and it is evident that an important development of this department of the provision business is in progress, for during the January-June period the value of the imports rose to £164,844, as compared with £143,399 in 1906. These figures, which are drawn from official sources and are therefore unimpeachable, give the lie direct to the pessimistic reports which have gained currency, and completely verify the statements on the subject which we have published from time to time. They, in fact, fully demonstrate the expanding value of the South African demand for bacon and hams, and should do much to encourage the enterprise of Home shippers in what is, beyond a shadow of doubt, their largest market in the world. Of the menace of local competition little need be said. The efforts to found a Colonial industry are of a spasmodic and ineffectual character, being rendered so by the initial fact that no effort is made to raise the breeding and management of pigs to an adequate standard in South Africa, and it is safe to say that many years must elapse before Colonial bacon and hams can be placed on the market in sufficient quantity and quality to make their competition a thing to be reckoned with in the slightest degree.

Note, in particular, that the figures quoted "fully demonstrate the expanding value of the South African demand for bacon and hams," and that South Africa is looked upon as being, "beyond a shadow of doubt," the "largest market in the world" for English shippers.

This may prove very interesting reading for English producers and shippers; but let the reader pause and consider what these undeniable facts imply so far as we in South Africa are concerned. They mean that South Africa is exporting wealth at the rate of over £200,000 per annum for the purchase of bacons and hams alone from overseas, when those bacons and hams, every pound of them, could be produced in our own country. Natal in 1906 consumed 549,178 lbs. of imported bacon and hams, valued at £18,324. That is to say, we are draining the country of wealth at the rate of some £18,000 per annum to supply our requirements in the line of bacon and hams alone. This is one of the many leaks that are partly responsible for the present depression, and it is one of no mean proportions. It is, further, one for which there can be no just excuse offered.

The argument that there is little or no local demand for *Natal* bacon and ham is no excuse for the neglect of an industry in which there are possibilities in this Colony equal to those of any other country. What must be considered in a case where a prejudice exists against locally produced stuff, is the question of nullifying the evil effects consequent upon the demand for overseas goods. This may be effected in the particular case which we are considering by the organisation of an export trade with the other South African Colonies. Here is a market to the extent of over £180,000. Were we to halve this amount—make it £90,000—or even quarter it and say that our possibilities in the direction of the export of bacon and hams are to the extent of £45,000, our own imported bacon and hams would be paid for and a large surplus would be placed to the country's credit, in addition.

To supply the whole of South Africa with all her requirements in so far as bacon and hams are concerned is an ideal that, we fear, must ever remain an ideal; but there is every reason why our farmers should bestir themselves and rapidly build up a flourishing export business with the other Colonies, and in a few years be supplying, say, quite half of the requirements of the rest of South Africa.

A start has been made in the Camperdown district in the direction of establishing a ham and bacon factory, on lines that contain greater promise of success than any similar project that has hitherto been undertaken in this country. There are three primary essentials that must be considered and accepted as such before success in any considerable degree can be realised. These are: (a) due attention to breeding, feeding, and management of the pigs; (b) regularity of supply of pigs to the factory; and (c) the adoption of co-operative principles.

Export of Mealies.

MOST gratifying are the results of the effort that is being made to establish an export trade in grain with Great Britain.

Once more we see the truth of the principle that adversity brings strength—in national as in individual life. Our commercial depression—one day we shall have cause to bless this much-maligned depression of ours!—has made us look to our own resources; and here we are with every prospect of some £200,000 or more coming into the country within the next two or three months as payment for the sale overseas of the half-a-million muids of mealies that we expect to export this season—and this season, moreover, we expected to do more than *experiment*!

The future lies with our farmers. What we are capable of doing now is evident. Our mealies are pronounced excellent, and they are realising good prices in Europe: a well-informed Durban correspondent tells us that 27s. 3d. per quarter has been paid in London for our grain this month, and in a cable to the Minister of Agriculture on the 16th October, the Agent-General stated that he had been informed that it is “extremely probable that the market will remain at 27s. to 28s. per quarter landed at wharf until the end of November.” Freights are low enough; and the presence of a Government-appointed inspector at the Port ensures adherence to standard. What more do we want? The next step is to extend the cultivation of our staple crop: there is plenty of land lying fallow on private farms all over the country which can be cultivated and a bumper crop be ensured next season. We have nothing to fear as regards the market. In the old days, to extend the cultivation of a crop beyond a certain limit spelt loss: to a certain degree, the smaller the crop was, the greater was the gain. Now, however, with the limitless market that lies before us, we can safely put more and more land under mealies; and the extent of our income from this grain will only be bounded by our ability to produce.

The following from the *Natal Mercury* comes as a refreshing breeze over the parched veld in these times of depression, and gives a good idea of what is being done: “Mealies are being sent to the port from up-country faster, almost, than accommodation can be found for them, and at the present rate the shed space available at the Point will be presently exceeded. Bags of yellow and white grain lie stacked in tens of thousands in Sheds C, D, E, and F, five and six deep, and covering every foot of the floor area, except the space that is kept clear for narrow alleyways between the ramparts of grain-bags. Rows of railway trucks, loaded with mealies, are constantly passing in and out of each shed, discharging fresh

consignments of grain for the great oversea market which Natal has just freshly discovered, and the Government inspector, Mr. Westbrook, is being kept employed each day, from half-past seven in the morning to half-past five in the afternoon, in doing nothing else but testing the grain in the bags, grading it according to quality, and certifying it to be fit for exportation as first-class Natal produce."

Notes and Comments.

OUR LATE APPEARANCE.—In spite of special efforts which have been made to bring the *Journal* out to time, delay in publishing has this month been inevitable owing to changes in the offices of the Department which took place at the time we should have been going to press.

INTRODUCTION OF SWINE FROM CAPE COLONY.—Proclamation No. 84, 1904, by which the importation of swine from Cape Colony was prohibited, was revoked by Proclamation in the *Government Gazette* of the 24th September.

MARKET FOR DRIED LOCUSTS.—Quotations are being called for by the Department of Agriculture, Capetown, for the supply of dried locusts in bags of not less than 75 lbs. nett, delivered f.o.r. at the nearest railway station. The locusts must be thoroughly dried before being bagged, and the bags guaranteed free from earth or stones.

DESTRUCTION OF JACKALS.—In consequence of the depredations of jackals amongst sheep and other stock as well as game, in various parts of the country, the Government has decided to offer a reward of ten shillings a head for their destruction. There are several kinds of jackals in the Colony, but it is only in respect of the most destructive variety—the Red or Black-backed or Silver Jackal, known by the natives as *Impungutsha* or *Ikanka*—that the reward is offered. For the young of the same kind of jackal, under three months old, half-a-crown per head will be paid. The reward may be obtained upon production of the entire skin—which must be fresh—at the nearest Magistracy. Applications for permission to hunt jackals on Crown Lands and Locations must be made to the Department of Agriculture, Pietermaritzburg.

RETURNED FRUIT AND VEGETABLE "EMPTIES."—From the 1st November empty packages which have been used for the conveyance of South African fruit and vegetables by rail between N.G.R. Stations will, when consigned as Returned South African Fruit Empties to the original consignor, be conveyed at the following rates: Up to 50 miles, 2d. per package; 51 miles and over, 3d. per package. These rates are station to station at owner's risk. These charges will not apply to returned South African egg, butter, and other boxes, which will be conveyed free at owner's risk, as at present.

S.A. PINES IN LONDON.—In a recent report to his Government on the Cape fruit trade, Mr. Chiappini, the Cape Trades Commissioner in London, says, with reference to pines: "I have had several trial shipments of these fruits sent to me for disposal, and there is a certain market for a very large trade being done in them. A good orange-coloured fruit of as large size as possible is required, and no fruit should be packed that is damaged or blemished in the slightest degree. Only one size should be packed in each box, and single-layer boxes to contain 10 or 12 fruits each, packed as tightly as possible, should be uniformly adopted. If the export is commenced as early as possible in the season and gradually increased, I am sure a market could be found for 10,000 dozens a week. The total cost for freight, railage, and sale charges should not exceed 2½d. each fruit, and the wholesale price for good-sized fruit of attractive appearance and flavour should be 5d. or 6d. each."

INTRODUCTION OF CATTLE FROM CAPE COLONY.—In consequence of the prevalence of lung sickness in Cape Colony, the introduction of all cattle from that Colony into Natal has been prohibited. This prohibition, however, does not apply to Alfred County: cattle will be allowed to be introduced into Alfred County from Cape Colony provided that they are accompanied by a certificate from a Magistrate or a Stock Inspector that they are free from infection, and that there has been no lung sickness on the farm from which they come for a period of three months. Cattle intended for slaughter purposes may, however, be imported into Natal from Cape Colony, provided that they are accompanied by a certificate from a Magistrate or a Stock Inspector stating that they are free from infection, and that there has been no lung sickness on the farm from which they come for a period of three months, and provided further that they travel direct from the border to Creighton Station under supervision, and that they are trucked direct to approved slaughter houses for immediate slaughter. Permission to introduce such slaughter cattle must first be obtained in writing from the Principal Veterinary Surgeon, Pietermaritzburg, who may impose any further conditions which he may deem necessary.

NATAL RUBBER FOR ENGLAND.—Early in October the “Armada Castle” took the first large shipment of rubber from Natal to England, a consignment of half a ton, which it is hoped will be followed by regular shipments. The rubber, which is declared by experts to be of first-rate quality, is from wild *Landolphia* vines in Amatongaland; and has been extracted under the supervision of Messrs. Lepper & Pennington, who two years ago obtained the lease of 600 square miles from Government for the purposes of rubber cultivation and extraction.

S.A. CONDENSED MILK.—Readers of the *Journal* interested in the progress of the condensed milk factory at Port Elizabeth, referred to in our May issue, will be glad to learn that this factory is unable to meet the demand which has already risen for its wares. According to the *South African Trade Journal*, experts speak most favourably of this product, which is said to be more than equal to the imported article. The same journal learns that it is not improbable that the site of the factory may be moved to a quarter where larger supplies of milk will be available, so as to reduce working expenses. A well-known firm of jam manufacturers in the Western Provinces of Cape Colony have also, it is stated, undertaken the manufacture of condensed milk, and have laid down a large plant specially imported from Europe.

ENTRY OF CATTLE INTO TRANSVAAL FROM NATAL.—The following regulations, framed under the provisions of the Transvaal Ordinance No. 17 of 1902, have been approved by His Excellency the Governor of the Transvaal:—1. No person shall import any cattle from the Colony of Natal, except cattle having been imported for breeding purposes from overseas and having passed through Natal by rail direct have entered this Colony under special permit and subject to such conditions as the Minister of Agriculture may prescribe; and any person contravening this Regulation shall be liable on conviction to a fine not exceeding fifty pounds and in default of payment to imprisonment with or without hard labour for a period not exceeding six months. 2. Any cattle which may after the date of the promulgation of these Regulations have come into this Colony from the Colony of Natal save such cattle as are expressly excepted from the prohibition contained in the preceding Regulation, and save such slaughter stock for which permits have at the date of such promulgation been issued, may be seized by any Resident Magistrate, Native Commissioner, Sub-Commissioner, Justice of the Peace, Police Officer or Constable, and detained and taken to a place of isolation, and the person so seizing and detaining such cattle shall immediately report all the circumstances to the Minister of Agriculture who may order any such cattle to be slaughtered or otherwise dealt with.

CO-OPERATIVE DAIRYING IN FINLAND.—The first co-operative butter export association in Finland (called the Valio) was founded in 1905. H.B.M. Consul at Helsingfors says, in a recent report, that, to begin with, this association had only 17 dairies belonging to it, but that by the end of the year the number had increased to 44. In January, 1906, about 300 casks of butter were exported per week. The maximum was reached in the summer of that year, when more than 2,000 casks per week were exported. The number of dairies belonging to the association has now increased to 70, and the total quantity of butter exported amounts to about 60,000 casks, valued at about £320,000.

EXPORT OF ANGORA GOATS FROM BASUTOLAND.—The following Government Notice appeared in the *Natal Government Gazette* of the 24th September: "It is hereby notified, for general information, that a proclamation is being issued by His Excellency the High Commissioner, imposing from and after the 1st October next, a duty of £100 upon the export of every Angora ram or ewe from Basutoland save and except to colonies and territories having similar legislation. The proclamation also imposes penalties upon any person who shall export from Basutoland any Angora ram or ewe in contravention of its terms. As Basutoland, by this proclamation, comes under the provisions of Act No. 12, 1901, Angora rams and ewes may, after the 1st October next, be taken to and from Basutoland without the payment of any duty.

THE PIPE-CALABASH.—The pipe-calabash industry in Cape Colony is assuming appreciable proportions; and in view of a possibility of the culture of this calabash on an extended scale in Natal, the following note upon its cultivation, supplied to the U.S. Consul-General at Capetown by the Department of Agriculture of Cape Colony will doubtless be of interest to readers:—A medium light loam, or even a sandy soil, is best for the successful growing of the pipe calabash. The growing season will vary with localities from four to five months; the condition under which it grows may be best described as semi-tropical, and it is usually found alongside tobacco, sweet potatoes and the like. It is characteristically a creeper, but occasionally rises into hedges or shrubs, growing as a climber. It requires abundant sunshine, and a warm soil and aspect. It is usually found in vegetable gardens, or on similar fertile, or at least well-manured, spots. Stable manure is commonly used. The stalks of the gourd shrivel when ripening takes place; the gourds are then collected and left on the bare ground in the sun till quite yellow and hard. In polishing and making into pipes, the aim seems to be to avoid breaking through the skin. In some places upright stakes are put round the gourds so as to assist the natural bend of the stem, but elsewhere this is left to nature.

SORE EYES AND HEAD IN POULTRY.—A correspondent of the *Natal Mercury* gives particulars (in the "Poultry Notes" column) of a simple treatment for sore eyes and head in fowls, which he has found successful in the case of a number of fowls of his own that were suffering from the ailment. The first thing, he says, is to isolate the birds, to prevent the disease spreading, then bathe with the following: To half a cup of black tea put a quarter of a teaspoonful of alum and bathe the head and eyes well. If it is vermin the writer states he always uses Keating's Powder freely in all coops and boxes, and on the birds as well. This keeps them free from all fleas—the small sand variety that obtains such a tight hold and causes the birds so much trouble.

FIBRE IN PORTUGUESE EAST AFRICA.—According to a report by H.B.M. Consul-General at Lourenco Marques (Major J. G. Baldwin), recently published by the Foreign Office, attention has been directed within the last year or two to the cultivation of fibre plants in Portuguese East Africa, and a considerable plantation of Sisal hemp has been started in the Inhambane district. It is stated to be immune from the attacks of white ants or other insects and to flourish in the dry sandy soil which is found near the coast. Experiments have been made with the same plant near Lourenco Marques, and some of the fibre produced has been found to be excellent, both in length and quality. Other varieties of *Agave* would no doubt, it is stated, do equally well, and there seem to be possibilities in their cultivation.

MANURING TOMATOES.—In a discussion at the Vegetable Growers' Association of Canada recently, the question of the best system of manuring the tomato crop was debated. The land, it was said, should not be too rich, but it is not so often a question of over-richness as that of less manuring. Fresh farmyard manure, applied to the land the same spring just before planting, was followed by an excessively wet season, and an excessive growth of vine was had at the expense of early maturity. A piece of heavier poor land that for years had never had any manure, the same wet season produced a profitable crop of tomatoes, while it had never done so in a dry season. An excessive use of nitrate of soda has produced vines at the expense of early maturity on sandy loam in good heart, while the heavier clay land has responded to the use of nitrate of soda in an increased crop. For the average season, sandy loam well manured with farmyard manure for a previous crop, then ploughed and worked in the spring and manured with a good superphosphate (14 per cent.) at the rate of 600 to 800 lbs. to the acre, and muriate or sulphate of potash 300 lbs. to the acre, is said to give good results. If the plants are slow in starting, giving enough nitrate of soda to start them, but not to prolong the growth, will prove beneficial.

COTTON IN CAPE COLONY.—We learn from the Bloemfontein *Post* that an effort is being made to encourage cotton-growing in the Cape Colony coast districts. A large quantity of the finest Egyptian cotton seed is being distributed among farmers who will undertake to prepare the ground in a suitable manner for planting. There are stated to be thousands of acres in this and other districts of the Colony lying between the Fish River, Buffalo, Nahoon, Great Kei, Bashee and St. John's, which could be utilised for cotton-growing.

SWEDISH SUGAR TRUST.—H.B.M. Minister at Stockholm reports, says the *Board of Trade Journal*, the combination of all the principal sugar producing industries in Sweden into one great company with a capital fixed at a minimum of five and a half millions sterling and a maximum of eleven millions. Of this maximum, it appears that about eight millions are being issued at once, and that shares to that amount have already been taken up. H.M. Minister adds that the more important producing industries have, for some years past, worked on the "Cartel" system in concert, but that their actual amalgamation into one vast company with headquarters in Stockholm, which will be able to control production and price, has come as something of a surprise, absolute secrecy having been maintained during the preliminary negotiations.

ADVANTAGES OF LAND DRAINAGE.—Elsewhere in this issue will be found a note upon the relation between irrigation and drainage as exemplified by the experience in the Yakima Valley, Washington, U.S.A. This should prove of particular interest to blockholders on the Weenen and Winterton Irrigation Settlements, and should, in fact, be found of value by all who are interested in irrigation matters. Draining is one of the first operations that have to be performed in bringing a soil into the condition best calculated to enable it to produce fine crops. The principle of drainage is not to get all the water out of the land, but only to carry away the surplus, and prevent water from becoming stagnant. When a soil becomes water-logged, fresh supplies of rain, with their gases in solution (carbonic acid gas, ammonia, and nitric acid, for example), cannot pass into the soil. On account of this and the fact that the stagnant water contains no plant food, a great loss occurs to the soil. Moreover, an undrained field is found to be much colder than one that is drained; and, again, air finds great difficulty in getting into undrained land, but when water passes through a soil, air must follow, or else there would be a vacuum. An improvement of temperature and mechanical condition of the soil; an earlier harvest, caused by the land being warmer; larger crops, on account of the deeper penetration of the roots into the soil and the consequent greater availability of plant-food; and a larger percentage in

the germination of seeds, may be mentioned as a few of the advantages which must follow an intelligent soil-drainage system. In addition, tillage is rendered easier and less expensive, for dry land is always easier to work than wet land, and there will be more opportunities of working it. Heavy clay land, in particular, may be mentioned as this class of land is rendered by drainage open and friable.

CO-OPERATIVE HORSE-INSURANCE.—The insurance of live stock is one of the many directions in which the value of co-operative principles of management is felt; and it is a question which is deserving of consideration in this country. On the Continent of Europe associations exist for the mutual insurance of all kinds of live stock on co-operative lines; and these associations are to be found organised in federations, thus gaining in financial strength, should an epidemic of disease occur in one locality. In Great Britain the insurance of live stock has been in existence as an adopted principle for many years, but not much has been done up to the present time to apply co-operative principles in any systematic manner. There are in existence certain commercial companies which have been established for the purpose of enabling owners of stock to insure their property, but these are in no sense co-operative, and the premiums do not encourage great advantage being taken of their existence by smaller farmers. Evidence, however, that mutual insurance of one—and that not the least valuable—description of live stock can be successfully undertaken on a small scale, is furnished by the Ninth Annual Report of the Newark Horse-Keepers' Insurance Company, Ltd., which is discussed by a writer in the August number of the *Journal* of the British Board of Agriculture. The objects of this undertaking are described to be: (a) to provide veterinary attendance in all cases of illness to animals insured with the company within a radius of eight miles; and (b) to pay to the insurers two-thirds of the market value of the animals insured in case of death by accident or by natural causes. The rates charged range as follows according to a definite scale: 2s. 2d. per quarter, for one animal valued at £7 10s. £5 payable at death; 5s. 9d. for one valued at £20, £13 6s. 8d. payable at death; 17s. 6d. for one valued at £60, £40 payable at death. For animals of greater value than £60 a special rate is quoted. These premiums entitle the insurer to free veterinary attendance and medicine should such be required during the period covered, and members are further entitled to the services and advice of the company's veterinary surgeon at a reduced fee of 5s. when purchasing a horse. The number of members now stands at 121; the market value of the horses insured is £3,505, the claimable value being £2,336 15s. 4d. The Newark Horse-Keepers' Insurance Company, Ltd., is an example of what can be done locally on small capital with capable control and management.

POISONING RATS.—There is, perhaps, no animal like the rat for vitality, prolificacy, persistency and cunning. It is a deadly pest to the young of all animals. Chickens and ducklings are never safe from it; it will eat young pigs and even attack young lambs. Grain-growing countries find it their worst pest. It destroys grain when newly planted, in the ear, when stored, when shipped, in a ship's hold, on the wharf, at the railway sheds. Rats are hard to trap, and are suspicious of poisoned baits. The *Journal* of the Jamaica Agricultural Society, however, makes some recommendations which will doubtless be found useful. It recommends, as "the only safe way of laying poison," the use of a double bamboo joint—that is, with the joint in the middle open at both ends. A bait is placed in each end, and thus dogs, cats or poultry cannot get at the poison. A different kind of bait should be used every week. Roasted salt fish, end of bacon, and toasted rind of cheese form the best baits, but ripe bananas and a crust of bread often do as well. The *Journal* in question recommends barium carbonate, or barytes, as one of the cheapest and most effective poisons for rats and mice. This mineral has the advantage of being without taste or smell, and, in the small quantities used in poisoning rats and mice, is harmless to larger animals. Its action on rodents is slow but reasonably sure, and has the further advantage that the animal, before dying, if exit be possible, usually leaves the premises in search of water. Its employment in houses, therefore, is rarely followed by the annoying odour which attends the use of the more virulent poisons. The poison may be fed in the form of a dough made of one-fifth barytes and four-fifths meal, but a more convenient bait is ordinary oatmeal, with one-eighth of its bulk of barytes, mixed with water in a stiff dough; or the barytes may be spread upon bread and butter or moistened toast. The prepared bait should be placed in rat runs, a small quantity at a time. Elsewhere strychnine may be employed with great success. Dry strychnine crystals may be inserted in small pieces of raw meat, Vienna sausage or toasted cheese, and these placed in the rat runs, or oatmeal may be wetted with a strychnine syrup, and small quantities laid out in the same way.

PURE versus CROSS-BRED FOWLS.—There are few questions of greater interest to the utility poultry-keeper than that as to whether pure or cross-bred fowls are the more profitable, and, as a correspondent of the *Agricultural Gazette*, London, points out, there is much to be said on both sides. To the fancier, of course, only pure-bred fowls possess any value, but as he tends to breed his fowls to a different standard from that of the utility man, exhibition strains may be left out of account. There remains, then, the choice between pure-bred fowls of utility strains and cross-bred birds. By "cross-bred" is meant the offspring from two pure breeds, birds of more mixed blood than this being "mongrels." The advantages of using pure-bred fowls are; Firstly, the breeder knows more or

less exactly what the progeny of his fowls will be like, as the purer the breed the more closely do the offspring resemble their parents. Secondly, pure-bred fowls always possess greater selling value, and if, as usually happens, there are some surplus cockerels for sale, a better price can be realised for them than if they were cross-bred, when they would only be fit for the table. Thirdly, there is always the chance that a particularly fine specimen may be bred fit for exhibition or the breeding of first-class stock, and this may mean a welcome windfall to the owner. Fourthly, the time taken by the pullets to reach maturity and come into profit can be more exactly calculated in the case of known broods, and hatching can be carried out accordingly. Lastly, where the sale of eggs, day-old chicks, or stock birds is the main business, it is undoubtedly more profitable to keep pure-bred breeding stock, as these cost no more to house and feed, and their offspring fetch much greater prices. Against these advantages it is urged on behalf of the cross-bred fowls that, firstly, they are hardier; and, secondly, being more vigorous, the pullets and hens are more prolific; thirdly, birds possessing the good qualities of both the parent breeds can to a large extent be produced (as in the case of Leghorn-Buff Orpingtons, Houdan-Leghorns), and that these are more useful as all-round birds to the utility breeder and ordinary farmer; fifthly, defects of an otherwise desirable breed can be minimised or done away with altogether by crossing with another suitable pure breed, as in the case of the Indian Game, which is too hard-fleshed a fowl to be a perfect table bird if used pure, but crossed with the Dorking or the Orpington gives splendid results. Again, the delicacy of the Dorking chickens makes it difficult to rear them in certain localities, but the offspring of the Dorking and the hardier variety breed are quite easily reared. It is a significant fact that the best birds at the leading dead table poultry shows are almost invariably cross-bred. The advantages of cross-breeding are still more marked in the case of ducks. It is well known what difficulty is experienced in getting a sufficient supply of eggs from pure-bred Aylesburys—the premier table breed—early in the season, but if the Pekin ducks are employed with the Aylesbury drake this difficulty is largely overcome. Here the superior egg-producing powers of the Pekin, crossed with the fine table properties of the Aylesbury, give a splendid result, when neither breed, used pure, would be quite satisfactory, the one as being a poor winter layer, the other as too yellow-fleshed, and not good enough in breast development for a first-class market duck. It is often urged against the keeping of cross-bred fowls that two separate breeding pens must be maintained to produce them, but this is not the case. Suppose, for instance, that the Leghorn-Buff Orpington cross is desired. The first year Orpington hens are run with a Leghorn cock. The resulting cockerels are marketed, and the pullets, which are half Orpington, half Leghorn, are mated next season with an Orpington cock,

The cockerels are again disposed of; the pullets, which are now roughly three-quarter Orpington, one-quarter Leghorn, are mated with a Leghorn cock, their offspring being once more about half-bred; and so on. It may be said that for the specialist in eggs for hatching, day-old chicks, and the rearing of stock for sale, pure breeds will pay best, as the prices to be obtained will be higher, the cost of maintenance being, of course, the same. On the other hand, the poultry-man who rears for the market will probably chiefly depend on cross-breeds; but the ordinary utility poultry farmer, who combines several branches, without specialising particularly in any one, will generally make use of both cross-bred and pure varieties of good utility strains.

Winter Feeding of Dairy Cows.

By E. R. SAWER, Director, Experiment Stations.

II.

RELATIVE VALUES OF DIFFERENT CLASSES OF ROUGHAGE.

In the August issue a record was entered of the relative results secured from a number of concentrates fed to dairy cows in conjunction with a uniform roughage ration. It was seen that oil-cakes of local manufacture mixed with mealie-meal or other starchy food could be very profitably employed as an element in any milking food. The next step in our enquiry has been to determine the respective merits of such classes of roughage as are commonly available to dairy farmers in Natal, with a view to the establishment of a complete ration promising the greatest margin of profit upon cost of production or purchase. During the whole period of experiment the cows employed were furnished with a uniform concentrate ration of 4 lb. mealie meal and 2 lb. cokernut cake, representing the most economic combination shown by the earlier experiment. During a preliminary period of 14 days all cows were also supplied with a uniform roughage ration of 20 lb. maize silage and 10 lb. maize stover, to which was added a weak solution of treacle. At the end of this period five other roughage rations were introduced and results as tabulated below secured. It was noted that in several cases feeds to which the cows were unaccustomed were at first refused, though afterwards eaten with relish. The effect was eliminated from the final results by allowing a second preliminary period of seven days, during which the cows were allowed to come under the influence of the new foods.

Concentrate Ration.	Roughage Ration.	Number of Cows.	Yield of Milk during a preceding period of 14 days.	Yield of Milk during preliminary period of 7 days.	Yield of Milk during trial period of 14 days.	Average Butter-fat before trial.	Average Butter-fat at close of trial.	Gain of Milk in 14 days due to roughage fed, as compared with complete maize roughage of stover and silage.
4lb. Mealie Meal 2lb. Cokernut Cake	20lb. Maize Silage 10lb. Maize Stover, with Treacle	2	253½	135	256	3.9	3.8	...
Ditto	5lb. Grass Hay (chaffed) 5lb. Millet Hay (chaffed) 20lb. Maize Silage	2	427	192	436½	4.8	4.9	9½
Ditto	10lb. Grass Hay (chaffed) 20lb. Roots (sliced)	2	486	226½	497½	3.6	3.9	11½
Ditto	10lb. Grass Hay (chaffed) 20lb. Maize Silage	2	282½	141½	297	3.9	3.7	14½
Ditto	10lb. Maize Stover, with Treacle 20lb. Sliced Roots	2	323½	150	363½	4.7	4.7	40
Ditto	10lb. Lucerne Hay (chaffed) 20lb. Maize Silage	2	216½	107	292½	4.3	4.3	73½

The above results disclose a number of interesting facts, of which the most noteworthy is the high value of lucerne hay as a milk producer. The substitution of 10 lb. of lucerne hay for an equal quantity of maize stover had the effect of increasing the milk flow in cows of comparatively poor capacity by 2 5-7th lb. per diem. It further appears that a whole maize roughage ration consisting of stover and silage is the least desirable of those employed, the substitution of roots leading to considerably better results where maize stover formed the dry element of the roughage. That this was due to the beneficial influence of variety in the ration may be seen from the fact that roots and maize silage fed in conjunction with grass hay gave almost identical results, which, however, slightly favoured the silage. This is in keeping with American findings, which attribute equal values to roots and silage, though cost of production is generally lower in the latter case. The substitution of 5 lb. millet hay for an equal quantity of grass hay led to a slight reduction in milk flow, but it is anticipated that this finding may possibly be reversed in further experiments. It will be noted that throughout these trials the character of the rations has had no very definite effect upon the butter-fat percentage, which result only confirms the generally accepted statement that the composition of milk is little, if at all, altered by a change in the nature of food, but is rather an hereditary feature to be bred into a herd by selection. On the other hand, the character of the food undoubtedly affects the churnability of the butter-fat, or, in other words, the proportion of total butter-fat obtained by churning; and pending completion of determinations in this connection, the following instances may be advanced:

	Per cent.
Grazing alone	86.64
Hay, mealie meal and bran	84.18
Hay and bran	81.37
Ensilage alone	81.25
Hay and mealie meal	74.63
Ensilage and mealie meal	65.69

A general survey of our experiments, as carried to the point recorded, reveals the fact that it has been possible to increase the milk production of graded and native cows by as much as 7 lb. per diem by substituting for an ordinary roughage ration of 20 lb. maize silage and 10 lb. maize stover, the complete ration of 4 lb. mealie meal, 2 lb. oil cake, 10 lb. lucerne hay and 20 lb. maize silage. If the difference in cost of production between lucerne and treacled maize stover be taken as 1s. per hundred, the value of inferior maize as 2s. 6d. per hundred on the farm, and the purchase price of oil-cake as 3d. per lb., the cost of producing the additional 7 lb. of milk is approximately 4d., of which the butter-fat at 4 per cent. and 1-5d. would realise 4 4-5d., leaving the farmer in

possession of 6½ lb. of skim milk for calf rearing or pig feeding, which will have cost him nothing. The indirect advantages to patrons of creameries resulting from the maintenance of a full supply of butter-fat during the winter will be self-apparent, a profitable outlet is found for quantities of inferior mealies, and also a means for establishing an industry in pork and bacon as an adjunct to the creamery in the most favourable conditions.

The system detailed above has been purposely applied to cows which would under ordinary treatment be classed as unprofitable from the dairyman's standpoint, and its extension to animals possessing better milk machinery will, it is confidently anticipated, lead to the establishment of a far wider margin of profit.

(To be continued.)

SUGAR FROM CHARCOAL.—Mr. Charles P. Stewart, of Los Angeles, California, claims to have invented a process for making sugar from charcoal. In an experiment, described in *Popular Mechanics* (Chicago), the inventor took an armful of pine wood, eucalyptus, mealie cobs, a piece of old buggy, and a barrel hoop, and piled them into an oven, where they were made into charcoal. The charcoal ready, he put 32½ lbs. of it into the retort and started the fire under his water boiler. Twenty minutes later, when things were getting hot, he started the air compressor and a set of highly charged electrodes. The water, converted into steam, passed through a heater, where it was dissociated into hydrogen and oxygen at a temperature of 3,000 degrees. The mixture of gases was then compressed upon the carbon heated to a like temperature. Then he let the compressed gas flow past the electrodes, and a fine spray of powdered sugar burst from the end of the pipe. Thirty minutes later it ceased. The output was about 70 lbs. of sugar. It is claimed that sugar can be produced commercially at a cost of only a halfpenny a pound. The idea itself is commented upon by Dr. Jas. Lawrie, of the Miner-Lawrie Laboratories, Chicago, as feasible. He remarks that, as sugar contains the elements carbon, hydrogen, and oxygen, in the proportions C12, H22, O11, in which the hydrogen and oxygen bear the same relationship as they do in water—namely, two parts of hydrogen to one of oxygen—the invention has thus all the starting material necessary, at practically no cost. The only problem was the combining of this material in the desired proportions of 12 parts of carbon to 11 of water.

The Fibre Industry of Mauritius.

By LEONARD AGUTT, J.P., Tongaat.
(*Member of the Natal Land Board*).

IN all districts of Natal there are to be found large areas of land which, from their position, or want of rainfall, are, although fertile, not suitable for the growth of any of our staple crops, or even for the grazing of stock.

On the Coast, with its greater heat and rainfall, there are thousands of acres of good land which are not suitable for sugar, tea, fruit, or any of the recognised products of the district, while in the more temperate mid-land and up-country districts, there is perhaps even a greater extent of land which is not suitable for the growth of wattles, English fruits, potatoes, oat-hay, mealies, etc., nor for the economic grazing of animals. It is, therefore, of the utmost importance that no opportunity should be lost to introduce such industries as promise to be suitable to what may be termed our waste lands, and that our farmers may have the choice of as many crops as possible.

Lately attention has been called to the fibre cultivation as an industry of this kind. In spite of the fact that some aloë-growing syndicates and companies have started operations, it was felt by some of our most prominent men both on the Coast and in the upper districts that it would be worth the while of the country to obtain a full report from Mauritius as to the present conditions and future prospects of the aloë fibre industry in that island. Money was subscribed towards the expense of such report, the Agricultural Department gave a grant on the £ for £ principle; and it was arranged that I should visit Mauritius; and, having just returned, I have the honour to submit my report for general information.

I may say that Mauritius, as the steamship sailings and other matters are at present arranged, is not an easy place to get to, nor is there any certainty of getting away again by any specified time.

There is an elasticity in the term "on or about" in connection with the advertised dates of sailings under which much delay is possible. The Union-Castle boats run irregularly and start from Delagoa Bay, and one experiences great difficulty in finding out to a day or two the date of sailing from that port, and also getting there in time for the steamer. Again, return tickets are not issued, and the Imperial Government having the first call on the accommodation, one cannot be sure of a return passage. Add to this the risk of quarantine at either port, and it will be seen that

one stands more than an off chance of being delayed a month. However, in my case the delay was all this end, and I was not delayed at Delagoa Bay or Mauritius.

The steamer had to go to Beira, and from there down the west coast and along the south coast of Madagascar, of which good views were obtained, then round the north of Reunion to Mauritius, the voyage from Durban, including stays at the ports, occupying 11 days.

MAURITIUS.

A short sketch of the history and main features of Mauritius will not be out of place here, and will doubtless be of interest to many Natalians.

The island was discovered by the Portuguese about 1507, and was called *Ilha de Cerne*. There were no inhabitants or traces of any. The Portuguese retained a nominal possession till 1598, when a Dutch squadron took formal possession, and called it Mauritius, in honour of Prince Maurice of Nassau, still leaving it uninhabited till 1644, when they made three settlements and built a port at Grandport to assist in the suppression of piracy. The Dutch, finding it unprofitable and troublesome, abandoned it in 1710 or 1712. In 1715 the French took possession and changed its name to *Isle de France*. Six years later it was ceded to the French East India Company, who, in 1734, sent out the famous Mahe de Labourdonnais, a man of eminent talents. He introduced the cultivation of sugar cane, cotton and indigo, made roads and established a capital at Port Louis.

In 1767 the island reverted to the Crown of France, and in 1810 came into the possession of the English. That possession was confirmed by the Treaty of Paris in 1814, and Mauritius is now a British Crown Colony.

The approach to Port Louis and the position of the town remind one of Capetown. The mountains, though not of the same height, tower over and dominate the town in the same way that Table Mountain does Capetown, but in Mauritius the mountains are not flat topped, but a series of peaks. The highest point of the island is 2,870 feet above the sea.

Mauritius is not subject to as great ranges of temperature as we get in Natal. Over a period of 13 years the mean temperature in shade was 73.8 degrees, with a maximum of 88.8 degrees, and a minimum of 54.1 degrees.

The rainfall varies greatly in different districts. The mean, taken over a period of 17 years, at eight stations, was 68.78 inches. The highest record was that of Cluny, Grandport—203.50 inches—while the mean at that place for 25 years was 142.26 inches. At Port Louis, which appears to be the driest district of the island, the rainfall is very little more than that of the coast of Natal, the mean over 25 years being 45.65 inches, our coast rainfall being about 41 inches, taking the mean over 40 years..

The population of the island at the last census was 375,400. The lowest recorded death rate per thousand over a period of 72 years was 24.90. In 1867 malarial fever appeared for the first time, and the mortality in that year reached the appalling figure of 125.11 per thousand. For the last five years it has been 37.3 per thousand, which is not much higher than before the fever made its first appearance.

Port Louis is distant from Durban a little over 1,500 miles.

The value of the exports from Mauritius in 1905 was £2,332,000, the chief item, of course, being sugar.

But the point which has the greatest interest for us in South Africa, with our almost limitless distances, is the small size of the island—the extreme length is only 34 miles, and the extreme width is only 22 miles, the total area being 713 square miles, or 456,320 acres. Compare this with the area of Natal, exclusive of Zululand (as given by Mr. Mullens in his “Economic Side of Agriculture in Natal,” published in the July *Agricultural Journal*—16,000,000 acres. Or imagine the island put down on some of our flat country: it would not be an impossible feat to ride round it in a day. We cannot but wonder, when we imagine the known given points in Natal between which the island could be put, at the population it carries and the great extent and value of its agricultural products. It has produced as much as 212,000 tons of sugar in a year, and our highest output in Natal has been barely over 30,000 tons.

One would naturally expect to see every inch of such a small country cultivated, but there are large tracts of land which, from steepness or poor rainfall, are not producing anything.

The soil is volcanic and generally of a red colour, but I should say is of a more porous character than our volcanic soils on the coast of Natal.

THE FIBRE INDUSTRY.

Fibre was first made from aloes in Mauritius in 1870, and in 1889 we find that the export of fibre was of a value of £100,000. It was extensively cultivated, but owing to a drop in price it was to some extent abandoned, but is now being taken up again. There are four plants from which fibre is manufactured:—(a) *Creole aloe*; (b) *Sisal aloe*; (c) *Agave Americana*; (d) *Sansevieria*. (I give the names by which they are known in Mauritius.)

The Creole aloe is the plant from which the bulk of the fibre is produced. This plant appears to be identical with the smooth-leaved, light green coloured aloe which is found so widely spread on our coast lands.

The Sisal aloe seems to be the same as the spike-leaved dark blue-green aloe which is also to be found on most coast farms.

The *Agave Americana* is a smaller plant, somewhat resembling the Sisal. I do not think it is widely spread here.

The *Sansevieria* is now being experimented with and plantations are

being made. It is, in appearance, like some wild plants which are to be found in many parts of the country here.

As stated, the crop of fibre may be said to be nearly all produced from the Creole aloe. I expected to find more attention paid to Sisal, but it is almost neglected, as it takes longer to grow and costs more to manufacture; and, although the price is somewhat higher, the Creole aloe gives the larger profit.

The *Agave Americana* is cut wherever found and the leaves put in with those of the Creole aloe in manufacture, but is not much in favour.

The *Sansevieria* is still only in the sample stage, but is certainly a coming fibre plant, the percentage of fibre being large.

Although the soil of the island is rich, the aloe is found growing well in places where there is very little soil, and almost on rocks. I do not think that richness of soil is a great factor in the production of fibre in Mauritius. Neither is extreme rainfall a factor, as all agree that the driest parts of the island produce the largest percentage of fibre, and that the dry season is better than the wet in this respect.

In a country producing so much fibre it would naturally be thought that large fields of the aloe would be found, but this is not the case at present. In the past there were fields of aloes, but beyond some few new plantations nothing is to be seen of cultivated aloes, and the crops of fibre now being obtained are got from wild plants. Whether the Creole aloe is indigenous to Mauritius or whether it was introduced at some remote period I could not ascertain, but it has taken charge of the entire country and is to be found growing everywhere, from the sea shore to the very mountain tops.

Some factory owners cut the leaves themselves, either from their own lands, or where they have arranged with owners of land or the Government to pay a royalty either on the leaves cut or on the weight of fibre produced. Other mill-owners contract for the supply of leaves, others again purchase leaves from coolies or anybody who will deliver them at the mill. One owner was cutting leaves from Crown lands, paying a royalty of about 30s. per ton on the dry fibre produced. He said he could pay more than that and make a profit. It seemed to me that the cost of collecting the leaves from aloes which are growing among rocks and ground covered with thorny shrubs and creepers must be very considerable, and go a long way towards neutralising the apparent advantage of getting them practically for nothing. At one place I saw leaves being collected from well up a steep mountain side, so steep that a wire rope had to be used to get down to the carts, into which the leaves were loaded and taken perhaps a mile or more to the factory.

The mode of cutting is to tie up as many of the centre leaves of the plant as it is intended to leave, and cut all below these and as close to the stem as practicable. This tying up is apparently done by men who can

be trusted, then the rank and file of the men and women know what to do. The question of how many leaves to tie up is a matter of discretion, for the more leaves there are left uncut, the sooner can another cutting be made, and the more leaves you cut, the bigger the crop for that year. It will occur to most of us that if we are paying a royalty only, and have no certainty of securing the next and succeeding crops, every possible leaf will be secured, whereas if the land belongs to the factory-owner the future crops will be considered in instructing the tyers how many leaves to tie up, and this is precisely what happens in Mauritius.

The general mode of transport of the leaves to factories is a small cart drawn by a Madagascar ox in shafts; in some cases the ox has a regular set of harness—collar, saddle, etc.—but for the most part our yoke, keys, and strop are used. The ox generally has a bit in his mouth, or a string in his nose. The greater part of the transport of the island (outside of the railways and tram lines) is done by these single ox carts, and a lot of work is done by these small units. The oxen are shod and as a rule are well conditioned. I have seen some heavy loads of sugar cane on such carts: I should judge at least 1,500 lbs. Roads are, of course, well graded and good where such loads are carried.

The plantations of Creole aloe now being made vary in distance apart of the plants from three feet each way to five feet each way. Some prefer the plants to be closer in the rows than between the rows, and I heard three feet by four feet and four feet by five feet advocated. The Sisal is planted wider, as much as eight feet each way being adopted, but the plantations of anything but the Creole aloe are not extensive.

The plants should be as large as possible when put in the fields,—certainly from three to four years old. If the young bulbs are planted, a large percentage die, and before cutting can be done from a full field planted with such young plants eight or even ten years may elapse.

The cultivation of the Creole aloe is of the roughest possible description, consisting merely of occasionally drawing the weeds and rubbish away from the plants and leaving it in the middle of the rows. One of the great objections to the Sisal is that it requires much more cultivation; not only must it be kept clearer of weeds and rubbish, but the suckers must be removed from time to time—and the plant appears to sucker very freely.

As all the aloe leaves now being cut are from wild plants, it is impossible to say what the yield of fibre per acre is. I was told that it would yield as much as one ton per acre, but the general opinion seemed to be that from half-a-ton to fifteen hundred pounds would be nearer the mark but no one can really give reliable information on this point. The yield of dry fibre may be put down at $2\frac{1}{2}$ per cent. of the weight of leaves. I have the following actual figures from one factory:—

Sisal yielded 2.92 per cent.

Creole aloe yielded 2.35 per cent.

I should think it very probable that we may look for a higher percentage of extraction than this in Natal, on account of the dryness of the climate.

The machinery used in the manufacture of aloe fibre is of the simplest possible description. The main machine, the scraper, or "Gratte," as it is termed in Mauritius, is shown in a wood-cut in the *Agricultural Journal* of July 26th, 1907; in Mr. Sim's article on fibre. It consists of a drum with angle iron bolted on across, and revolving at a speed of 600 revolutions a minute. The drum revolves towards the feeder, and a very small space is left between the angle iron and the service plate, so that the skin and pulp get scraped off the leaves. This is done dry—no water being used at this stage. The machine strikes one as being very primitive and as if it would not be difficult to invent something which would do the work better. I saw at the Forges et Fonderies, in Port Louis, a machine which has just been made, but it did not commend itself to me as being practical. It seems as if water ought to be used in pulping.

The "grattes" are covered in, and the aloe leaves are fed through a slit which just prevents a man's hand being drawn in. The men employed feeding the leaves to the machines wear gloves to protect their hands from the juices of the aloe. Each leaf has to be presented to the machine separately, allowed to be drawn half-way in, then withdrawn and turned round, and the other half treated in the same way and withdrawn. The treated leaves are in some cases just dropped on the ground, in others hung over iron bars. The angle irons at some factories were kept sharpened, in others worked just as they were; and I think the unsharpened irons did the better work.

After the scraping, the green fibre is put into a cement tank with fresh water enough to cover it, where it remains for about six hours. It is then taken out and put into another tank with clean water, where it does not remain long, but is taken out in convenient sized masses and beaten by women with blocks of wood on the walls of the cement tank, and after this process it is thrown into tank No. 3, in which is soap and water in the proportion of 1 lb. of soap to 200 lbs. of green fibre. The soap is melted and boiled up in tins or boilers and added as the water flows into the tank. Hot water is recommended for this tank, but cold water is more generally used. In this tank the fibre remains for from 20 to 40 hours—the exact time being a matter of experience. From this it passes to No. 4 tank, which has clean water in it, and it is here washed finally and taken out to the drying grounds, where it is hung on sticks or wires to dry.

From the drying grounds it is brought into the factory and goes through a machine called a "Batteuse." This is a similar machine to the "Gratte," only the angle irons are not so close together and run at

different speed. The feeding man allows a large lot of the dry fibre to be drawn into the machine, where it gets a battering about and gets a lot of the dry mucilage knocked off; he draws it out again and presents the other end, so that the process is the same as with the leaves as they come from the field.

After this process the fibre is all picked over by coolie women, each using a large pair of scissors, with which they cut out any pieces which may be discoloured, or be stuck together with mucilage which still remains after the processes described. It is then ready for baling. The baling presses used are mostly hand presses with two screws, and the bales are banded with ropes made from the waste fibre. The bales run from five to six to the long ton.

The amount of refuse is, of course, great, as a factory producing one ton of dry fibre a day will have nearly forty tons of green slime to get rid of besides the water from the tanks. The slime is taken out on to the fields of cane near, or disposed of on waste lands, and the water is run also on to the land in furrows. I did not observe any nuisance from this refuse at any factory, either in bad smells or polluted streams. The refuse is, of course, a good fertiliser.

The motive power used is water power (which is, of course, the cheapest), electricity, and steam. The amount of water necessary is not great and will not stand in the way of small factories being put up in any part of Natal. For a factory turning out a ton of fibre a day the amount of water required is given at 2,000 gallons per day. This, I think, is perhaps an underestimate, and 3,000 gallons might be required; but a factory turning out a ton of dry fibre a day is a large one, and I did not see any of that size, a capacity of from half to three-quarters of a ton daily being the rule.

The aloe leaves will not keep after being cut, but must be dealt with as soon as possible. The effect of keeping is, not to cause any deterioration in the strength of the fibre, but to produce a bad-coloured article which is only saleable at a lower price.

I find that sugar-growing for Central Mills is carried on together with the aloe fibre industry, and this would be practicable on the Coast Lands of Natal. The refuse from the fibre factory provides manure for the cane fields. The crushing season is short, and during its continuance the fibre factories stop working if necessary, and put all forces of labour and transport on to getting off the cane crop; and, as fibre-making goes on all the year round, the two industries fit in well together.

The price of fibre is ruled mainly by that of manilla hemp, although it is claimed for the aloe fibre that it can be used to some extent in the manufacture of textile fabrics, being mixed with cotton, flax and wool, which is not the case with manilla hemp, nor, I should imagine, with Sisal

fibre, from its great coarseness compared with aloe fibre. The prices at present at Port Louis are:

	£	s.	d.	
Prime, about	23	10	0	per ton.
Good, about	21	10	0	„
Fair, about	20	0	0	„

The value of fibre shipped from Mauritius for the four years 1902-5 is given as—

	£
1902	62,523
1903	36,749
1904	41,834
1905	37,636

The number of aloe factories is given as 48. Whether these are all working or not I cannot say, but if they are, the average output per factory was only 38½ tons for the year 1905.

A plant of machinery capable of turning out 1 ton of dry fibre per day would require 30 h.p. to work.

I have two estimates for the machinery without the driving power: The estimate which is most complete gives a price of £325 for a ton-a-day plant delivered Port Louis. If to this be added the cost of 30 h.p. steam, water, or electricity, the further outlay for buildings, tanks, etc., can be estimated and the probable cost of a ton-a-day plant complete can be fairly well arrived at.

It is well known that it is difficult to get at the cost of any one operation in any industry, and I find my notes somewhat conflicting on the point of manufacture alone, but going carefully over the figures I conclude that £4 will cover the expense of making a ton of dry fibre. The cost of growing and transporting the leaves, it is impossible to arrive at. I found, however, at one factory that 5s. per ton was paid for leaves, delivered. This would be £10 for leaves enough to make a ton of fibre. It will be said that, as the leaves are wild, this does not include cost of production of them, but the cost of obtaining the wild leaves appears to me to be so great, getting here a few leaves, and there a few, and having to cut paths to them through thorns and scrub, that the growing of them in more accessible positions would cost little, if any, more. In my estimate of £4 per ton for factory expenses, I have charged the labour at Natal prices, and believe I am within the mark. Coolie labour in Mauritius costs 10d. per day, and is of a better class at that price than our labour, costing 1s. 6d. per day for all charges.

There is no place in Mauritius where the aloe leaves are dealt with in the fields to save the excessive transport to the factory. Were it possible to do the first process of scraping in the fields, 30 to 35 tons out of the 40 tons' weight of leaves necessary to make a ton of dry fibre would be

got rid of, but with the present process, this would mean arranging for the bulk of the machinery and power to be rendered portable. With very large plantations comprising many thousands of acres, involving long distances of transport this might be done. It would probably then only mean the establishment of centres where this concentration could be done, and might really involve as much transport as is required to take the leaves entire to the present small factories. I cannot imagine any machine which could be moved up the rows and do absolutely away with the transport of the leaves.

With regard to the age at which the cropping of the plants may commence: opinions vary on this point as much as on others. So much depends upon what age the plants are when put out in the fields. If very young plants are planted, all planters agree that a very long time may elapse before cutting can commence; one planter put it at 10 years, but if a well grown plant is selected, either from wild stock or from plant beds, plants of perhaps two years old, rejecting all backward plants, leaves may be cut in four years and continue to yield for from 10 to 15 years before requiring to be replaced.

I think the foregoing gives fairly all the information on all points of the aloe culture and manufacture which is to be obtained in Mauritius, and it only remains for me to remark on the possibilities before the industry in our Colony.

NATAL'S POSSIBILITIES.

First, with regard to what plant we should cultivate to produce fibre:

Now, we find that the fibre produced in Mauritius is, one may say, wholly made from the Creole aloe, and that this is the kind which is being extensively planted out. Plantations of other kinds are made on a small scale, but the Creole aloe is as much the mainstay of the fibre industry in Mauritius as the Yuba variety of sugar cane is of the sugar industry in Natal.

Whether the Creole aloe of Mauritius is identical with the *Furcraea* as known in Natal can surely be settled very shortly by obtaining the plant from Mauritius, or rather such parts of it as are necessary to enable botanists to decide the point. It is probably identical; at any rate our plant yields a good fibre. Mr. Sim, in his paper on "Sisal, Mauritius Hemp, and other 'Aloe' Fibre," after reviewing the difficulty and cost of obtaining Sisal plants in sufficient quantities to start a large industry, says: "The whole question seems to turn on whether the kind we have here (*Furcraea*), and of which plants are easily and cheaply obtainable, is sufficiently good to go on with meantime until these points are cleared up, and until a large supply of Sisal can be raised locally, or obtained from East Africa or elsewhere on terms which are not prohibitive."

I think the answer to this must be that our plant should receive our

first attention and that experiments should be made with "Sisal" to prove its suitability to our climate and conditions.

I was much struck with the *Sansevieria*, and trust that both this and the *Agave Americana* (so called in Mauritius) will receive attention. Further than that, the whole question of the fibre supply of the world is of so much importance that I would advocate a thorough scrutiny of our native plants and grasses known to be rich in fibre, and our experiment farms in all parts of the Colony could not do better than devote part of their space to the cultivation of these wild plants.

Now, with regard to the suitability of the fibre industry for Natal:

I have estimated that fibre can be manufactured from the leaf for £4 per ton, and it is not for me to say what the cost of producing aloe leaves enough to make a ton of fibre and delivering them at a factory will be. In the first place I could gain no information on this point in Mauritius; again, cost of production in one place may be low, but cost of transport high, or the reverse may be the case. Then labour is a factor; and there are many things which may make costs of either operation vary very considerably in different districts.

In Mauritius, in reply to my queries as to what it cost to collect the aloe leaves and transport them to factory sufficient to make a ton of fibre and to bring same to a marketable condition, I received replies that the total cost would vary from £15 to £17 a ton; and that in many districts of Natal it can be made at that cost I do not doubt.

The main danger we have here threatening any aloe plantations is that of fire. The cultivation of the Creole aloe need only be of the roughest possible description, but a rough cultivation in this country means a quantity of grass and debris which becomes dangerously inflammable in the winter. In Mauritius this does not occur, the grass and debris is not, beyond in small patches, inflammable at any time of the year. Therefore either cultivation would have to be done to keep down the grass, or we should have to be careful to prevent outside fires coming in, and keep all roads and paths in the plantations themselves free of inflammable material.

I think that on the coast lands of Natal, sugar-growing for central factories can be worked in with aloe-growing, in the same way as obtains in Mauritius. Two or more small farmers, or a group of cane farmers, could have a small factory of a capacity of, say, 50 or 100 tons of fibre per annum. This would not cost more than a few hundred pounds and would only require some 8 horse power; and a gross return of one or two thousand pounds sterling would be a welcome sum to come in between the cane crops. A good manure would be obtained for the cane fields, and the farmers would be able to utilise land which would not carry crops of sugar cane. Inland of the immediate coast belt, and up to the 2,000 feet level, there is a lot of land which could be used for aloe growing, land

which, though good, is too dry to carry crops of the ordinary character in the winter, but which would grow aloes. I do not doubt that there are many districts in the upper part of the country in which aloes would do well. Many parts of the "Thorns" certainly would, and there are thousands of acres which are fit for no other crop, by reason of stones and poor rainfall.

I think this would be a crop which the natives might be encouraged to grow. Young plants might be scattered broadcast in kloofs and sheltered spots in locations; and the aloe might take charge of such places as it has done to such an extent in Mauritius, and prove a source of income in a few years' time and make productive a large area of land on which nothing else can be produced.

There is no doubt in my mind that the aloe fibre industry will prove a useful one to our Colony; and, while not promising large fortunes, in a few years without any trouble will prove more payable than many enterprises in which our farmers are now engaged, besides making use of parts of farms on the better land of which other crops are being grown, and bringing whole districts into a productive condition.

I must sound a note of warning on some important points:—

The first that occurs to me is that of the plants which may be used. Any plants with which plantations are formed should be well grown. A great many suitable plants can be got from self-sown aloes, but for large plantations they must be raised in beds; the young plants must be collected and planted in rows in ground properly prepared. These will soon develop into plants which, when put out in the fields, are vigorous and well grown, and which may be cut for fibre-making in from 3 to 5 years, whereas, if too young plants are put out in the main plantations, it will be a long time before the first crop can be cut.

It should be borne in mind that it is not the province of those who first attempt to establish a new industry to spend money in experimenting in machinery; and until a company is doing well and has got a fair start, none but the most thoroughly proved plant should be erected.

I would advise those going in for aloe plantations not to figure on a greater annual crop than 1,000 lbs. per acre, and even this amount may not be obtained for the first cutting if a liberal number of leaves is left for future crops.

But the most important matter in connection with fibre-growing is the way in which the fields are laid out. Let it always be borne in mind that to obtain one ton of fibre some 40 tons of leaves have to be transported. It will be obvious that the transport of this tonnage will always form the most expensive item in the whole of the operations, and therefore the fields should be laid out in relation to the factory so that the minimum of traction is necessary; and roads or tram lines should be laid

out before the fields are planted, or, at any rate, before the aloes grow to any size.

But, even with a good system of roads, it may not be easy to get the leaves to them. Imagine, say, 600 acres covered with aloes well grown and ready for yielding a cutting of leaves. How are the cutters to get at the leaves and carry them to the roads through the interleaved mass which the field will then present? In cutting a field of sugar cane, cutting is begun at a road or tram line, and any part which is cut leaves the ground clear and facilitates the access to the uncut parts, and canes can be carried across any part of the field which is cut, and so reach the roads or tram lines. But this is not the case with an aloe field; the cut portion is very little easier to get through than that which has not been touched, and provision must be made for getting easily from the fields to the roads, or the cost of cutting and carrying will be heavy. Whether it would be better to plant 2 rows rather closer together and leave a practicable path down the next rows or whether in some other way it is arranged that the cutters can easily reach a path, I am not prepared to say, but it will be obvious the provision must be made for easy access to the roads.

These points are of the utmost importance. Any attempt to establish fields of aloes with very young plants, any waste of money in experimenting with machinery, or any neglect in laying out roads and fields properly, will be bound to cause disappointment and loss and might wreck the first efforts to establish this industry, and throw discredit upon it from which it would be up-hill work to recover.

With regard to machinery: that in use in Mauritius, although rough, has the advantage of being applicable to small or large factories. One could begin with one "Gratte," which would only take some 6 or 8 horse power and make a ton of fibre a week, dealing with the produce of about 100 acres of aloes in a year, and add to it as one's further acreage came into bearing. And for acreages under 1,000 it is probably the most suitable machine, and not until plantations run into thousands of acres need portable machinery be considered.

To conclude, I must here tender my most sincere thanks to my friends in Mauritius for the free manner in which they gave me every information in their power, at times at the cost of giving up a day to me and showing me the best in their districts. I knew no one in Mauritius when I landed in Port Louis, and had it not been for the kindness of those to whom I had introductions, and of those to whom I was introduced, I should have had great difficulty in getting the information I required. I shall always gratefully remember the kindness and hospitality of the people of Mauritius.

Export of Citrus Fruits.

MR. F. L. WHITE'S REPORT.

THE following report on Natal citrus fruits exported to the English and Continental markets during this season has been submitted to the Minister of Agriculture by Mr. F. L. White, who, it will be remembered, accompanied the preliminary consignments to England and arranged for the marketing of the fruit there.

“To the Hon. Minister of Agriculture,—

“I have pleasure in handing you herewith my report on the citrus fruit exported during the present season and on the many lessons to be learned by Natal farmers.

ORANGES.

“I found these accepted well in the provincial markets and the prices obtained for them to be very satisfactory, but the wastage and loss during the voyage so dwindled the returns to the grower as to be a failure from his point of view. The general consensus of opinion amongst dealers was that our oranges had not sufficient colour to command a high figure, and were too sour for the taste of the English public. I certainly noticed that our fruit, although full of juice, always showed that it had been grafted on to lemon stocks, and this I consider a great mistake when the fruit is required for export purposes. I strongly recommend growers who are planting orchards of this fruit to try the up-to-date Washington Navel (of the California grower, which has been universally accepted as the best export orange).

“In packing the orange for export no wood-wool should be used, but all cases should be packed tightly and an even pressure put upon the fruit by the lid, when the case is nailed down. The very greatest care should be exercised in seeing that no stung fruit is packed, and fruit should be picked at least five days before being packed—the fruit being stored during that time in cool, dry sheds or store rooms. Natal oranges, especially those grown on the Coast, rapidly lose their bright fresh appearance after being picked. This, I believe, is caused by too much moisture in the cells of the skin, and could be overcome by judicious manuring, pruning and cultivation. I do not advocate packing oranges in such large cases as those used by the Spanish growers, but in a standard case holding 100 to 120 fruits, which should be of as uniform size as possible.

“Oranges will never command fancy prices in England again, as so many countries have larger orchards and oranges do not find a ready sale when the English soft fruits, such as cherries, gooseberries and straw-

berries, are in season, *i.e.*, during the same months as the Natal orange ripens, June, July, and August. The conclusion I arrived at was that a trade could be built up if growers would plant the varieties that are suitable and pack them in up-to-date methods.

NAARTJES.

"This fruit met with really a fine reception in the London and provincial markets during June, partly on account of the scarcity of English fruit due to the cold and wet summer of this year, and to the fact that the California fruit was rapidly getting scarcer, and because Madeira, the Canaries and the Azores had very little fruit to offer the English market. I am fully persuaded that the Natal naartjes will be looked for next summer and that an export trade in this fruit is established.

PICKING.

"Naartjes should not be picked for export until fully ripe and well coloured, as the buyer in England looks for colour and studies *appearance first*, and fruit of good colour takes preference to that which may be larger but of a paler shade.

PACKING.

"The universal opinion expressed was that the tray of 14in. x 12in. x 2in., containing 24 fruits, was the best sent Home this year. Not only did the fruit carry better and present a better appearance whilst in single layers, but these trays were preferred by all buyers although they held less fruit than the boxes, and consequently they were paying a higher rate for their fruit. For future shipments I would advocate the use of even a smaller tray, holding only 12 fruits, and measuring 12in. x 9in. x 2in. In packing naartjes for export, the very smallest quantity of wood-wool should be used, whilst in the trays of one layer of fruit no wood-wool is required. All fruit should, of course, be wrapped in paper; the proper white or tinted fruit wrappers only being used.

"All cases or trays of citrus fruit should be tightly packed and no space should be left for the fruit to work loose while on the journey. In order to pack citrus fruits tightly the fruit should be cut a week before date of shipping and stored in the coolest place procurable, and the very greatest care should be exercised that no stung, scarred, damaged or fallen fruit is included.

"I am perfectly convinced that naartjes can be kept in cool storage for three months with only 2 per cent. loss, because in opening up trays in London from the shipments received after the 1st July from some senders, no loss was found, and in cases of 100 where the same sender had packed fruit which he had not so carefully selected the loss was sometimes as high as 15 per cent., proving conclusively, to my mind, that the carrying capacity of this fruit is far beyond what exporters have imagined.

"The average price received in London was 8s. to 10s. per 100, and I feel sure that there is almost an unlimited sale for good fruit at this price. Of course, when freight charges at this end and expenses and commissions for selling in England are deducted from the returns, there has not been a big margin left for the farmer, but charges must be kept down as low as possible and freights in cool chamber at a lower rate than 70s. (which practically means 2s. per 100 for freight) arranged for, and also a thoroughly well organised means of distribution in England of the regular consignments by an appointed agent or agents. With these facilities I have no doubt that the export trade will be firmly established.

"I have already mentioned the great importance of colour in the fruit, and I must again impress upon all growers to cultivate whatever crops they have upon their lands, and in the case of citrus fruits to irrigate and manure their trees, prune where necessary, and if their fruit lacks colour to use copperas (sulphate of iron) to the roots in order to produce the necessary colour appearance which is so greatly in demand in the European market.

"And now to summarise the

LESSONS LEARNT

by me, in a few words: First, no fruit should be picked for export and shipped that is not fully matured and of good colour. Second, all cases should be well and tightly filled with fruit and very little or no wood-wool used in packing. Third, fruit to be cut seven days before shipping, and no fruit included in cases that shows any signs of deterioration.

"I have, of course, not gone into the question of the Government opening up an Agency in England, but I would suggest that this matter be thoroughly investigated by you and if possible a Government Agent appointed in London to distribute Natal produce. All the consignments sent me were handled by Messrs. Hudson & Sons, Cannon Street, which firm handles quite 75 per cent. of the fruit sent Home from the Cape.

"As I understand the Secretary of the Natal Orchard Association is drawing up a return of the cost and expenses in handling Natal fruit, I prefer to leave my suggestions on this matter until this is published.—Yours, etc.,

"FRANK L. WHITE.

"Durban, 20th Sept., 1907."

If an egg is broken in the feed of horses occasionally, the result is stated to be highly beneficial. It has a tendency to clear the skin and make the hair take on a bright, healthy appearance.

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experiment Stations.

TOBACCO MANURES AND FERTILISERS.

TOBACCOS, other than chewing leaf and snuffs, are cultivated and manufactured for the products of combustion or smoke, and their burning qualities are therefore of the first importance. The term "burn," as applied to tobacco, has reference to several well defined features which have all to be considered by the planter and manufacturer. To be acceptable to buyers the cured leaf must hold fire steadily and evenly without a tendency to "coal" or "carbonize" in advance of the actual burning area. Combustion must be sufficiently gradual to prevent flaming or explosive action, and the market further demands that the mineral residue, or "ash," shall be white in colour and firmly coherent. The absence of any of these qualities will seriously discount value of the leaf or manufactured products, and as they can be controlled by careful choice of locality, soil and manures, a discussion of the methods available for ensuring a satisfactory result will not be out of place.

Tobacco leaf is characterised by a high content of mineral matter, which often exceeds 20 per cent. of the total weight and exercises an all important influence on the combustion of the organic material. The glowing capacity of tobacco is dependent upon the large proportion of mineral salts, and if these be extracted the leaf will burn with a flame. It thus often happens that coarse and rank leaf shows a tendency to flare when lighted, which result is due to a marked deficiency in mineral constituents; and, similarly, the removal of soluble salts by "washing" or "dipping" of the leaf prior to rolling may injuriously affect burning qualities. Certain substances interfere with combustion while others favour it, and the relative proportions of the former and the latter will determine the character of the burn.

The difficulty of securing a sufficiency of kraal manure during the present season, owing to the ravages of East Coast Fever amongst our cattle, lends an additional importance to commercial fertilisers as an alternative. This outcome is not to be altogether regretted, for the unlimited employment of coarse organic manures has in the past lowered the standard of much of the local leaf, and the substitution of mineral

fertilisers should have the desired effect of producing a finer type of leaf with more delicate aroma.

A certain amount of organic matter in the soil is, however, essential to good results and further assists in retaining moisture during periods of drought. If deficient this is best supplied by plowing under a green manure crop either before or after the planting of tobacco. Lupines, red kafir bean, cow-pea and soy bean are available for this purpose, and should be harrowed down with the cut-away disc and ploughed under while in flower. In this way exhaustion of the soil may be prevented and the same land repeatedly cropped with tobacco.

Many of the fertilisers in general use with staple crops are quite unsuitable for tobacco, and selection must be based upon a clear knowledge of the influence of the different available salts on the burning qualities of the leaf. It has been repeatedly demonstrated that all chlorides and sulphates injure the burn and fire-holding capacity of the leaf, while, on the other hand, salts of potash and lime must be furnished in some form. The fire-holding capacity is indeed dependent upon the presence of potash, and lime is required for the production of a well coloured coherent ash. Phosphates are practically neutral in their effect on the burn, but beneficial in so far as they may increase the vigour of the crop without impairing the quality of the product. Where a light, mild-flavoured leaf is desired, nitrogenous manures should be used sparingly, as they have a marked effect on the percentage of nicotine, and are consequently indicated, on the other hand, for plug, snuff and other heavy classes of tobacco.

The majority of our proved tobacco soils contain an appreciable percentage of lime, though in many cases the crop may benefit from a dressing of this stimulant which not only improves tilth, but maintains rapid development of the plants, bringing them more quickly through the rooting stage. The chloride and sulphate of calcium are to be avoided at all costs, as even in moderate quantities they are very injurious. In almost all districts the natural soil content of phosphates and potash requires to be supplemented after the first crop by artificial supplies. The former should be supplied in the form of basic slag, or acid phosphate where transport is a consideration, rather than as bone phosphate which is less readily available. Since potash again can be used neither as the chloride nor sulphate for the reasons stated above, the only practical sources of supply are the carbonate and the nitrate, and as a matter of fact almost all of the proprietary tobacco fertilisers contain the latter salt as an essential constituent. A warning is necessary against the use of the commoner grades of commercial nitrate which frequently contains an injurious proportion of chlorides, and a guarantee should be secured that these do not exceed 2 per cent. of the total weight.

In view of the fact that a tobacco industry has been pioneered in the outlying districts of Natal at a distance from the railway, the question of

carriage is an all important consideration, and a highly concentrated fertiliser desirable. A formula has consequently been compiled bearing a definite relation to this requirement and the character of our tobacco soils, the corresponding fertiliser containing six parts of high grade superphosphate, two parts of nitrate of potash and two of bone dust. This complete mineral manure can be supplied at the rate of £8 5s per ton plus freight to centre of distribution, and should be employed at the rate of 300 lbs. per acre. The profitable employment of high priced fertilisers is an index to successful tobacco planting, and an expenditure of £20 per acre in this connection is not unusual in many of the tobacco districts of the United States, an adequate return being secured in the quality and weight of the resulting leaf. That the tobacco crop is a very exhausting one cannot be denied, and it has been shown that a harvest of 6,000 lbs. removes from the soil 274 lbs. nitrogen, 44 of phosphoric acid and 170 lbs. of potash, while the residue, represented by stems and roots, contains 598 lbs. of nitrogen, 184 lbs. phosphoric acid, and 792 lbs. of potash. The latter may, and should, be returned to the soil, but the demands of the leaves alone compel constant attention to the renovation of our tobacco lands if exhaustion is to be obviated, to which end a careful rotation of crops, a system of green manuring and suitable fertilisers must be regularly employed.

TRANSPLANTING.

The object of the tobacco planter should be to bring his crop to maturity within sixty to seventy days from transplanting. Such a result can only be secured when the ground has been brought to the best possible tilth by repeated ploughing and harrowing. Level cultivation is only admissible when there is no possible danger of water standing in the surface soil, and on all but thoroughly drained lands ridges should be thrown up by turning two shallow furrows together with a light orchard plough. This system further prevents the leaves from being damaged by splashing of mud during heavy rains and also furnishes a means of irrigating the crop. If desired, hills can be formed by cross-ridging at such distances as it is intended that the plants shall be spaced in the rows, after which the two front angles of the square are drawn into the middle and the top flattened with the hoe. The wider spacing given to the ordinary types of pipe tobacco lends to hilling the additional advantage of permitting cross cultivation with the horse hoe. Cigarette and cigar tobaccos should, however, be planted much closer together in the row, and though in a new locality the planter must determine the best distances by experiment, it may be generally stated that good results are to be secured rather by crowding the plants than by allowing them too much room. In America the use of the horse hoe is reflected in a universal spacing of three to three and a half feet for manufacturing types, which treatment could only lead in the cases of the finer cigar and cigarette leaf to the loss

of their characteristic delicacy of texture. The majority of Cuban and Sumatran tobaccos are allowed not more than a foot or fourteen inches in the row, though some of the more vigorous varieties may receive a spacing of two feet. The Turkish plants are relatively small and should never be set too far apart. The following scale is based upon South African experience and will be applicable to nearly all districts in Natal:—

Connecticut, Brazilian, Honduras, Burley, Medley Prior, spaced 3 feet x 3 feet—4,840 plants per acre.

Cuban, Zimmer Spanish, Sumatra, Havana, spaced 3 feet x 2 feet—7,260 plants per acre.

Virginian, Hester, Goldfinder, Warne, spaced 3 feet x 2½ feet—5,808 plants per acre.

Turkish, spaced 1½ feet x 1½ feet—58,080 plants per acre.

The actual planting should be done during or after rain. If the day be cloudy the work may be commenced early, but if the morning be hot and dry, the planting should be left until the latter half of the afternoon, so as to give the seedlings an opportunity to recover and establish themselves during the coolness of the night. They are ready for removal to the plantation when their leaves have attained the size of a penny piece. Choice should be made of those showing broad short leaves, and all those with long narrow leaves should be discarded, as this feature is an early index to the type of foliage the adult plant will carry. Prior to transplanting thoroughly saturate the seed bed and loosen the seedlings with a garden fork. They may then be drawn without injury to the roots by taking the leaves between thumb and finger, and placed in a basket which should be kept covered with a wet cloth. In the field they should be taken in the left hand while a hole is made with one finger of the right hand in the centre of the hill or ridge. Avoid making too deep a hole, and see that the roots are neither crushed nor turned up, for in such case the plant may live but will never flourish. It is also important that the soil be brought well round the bottom of the root, for if hanging by the neck the plant will early die. If irrigation water be available, it can generally be profitably employed at this stage to give the crop an early start. After three or four days the surface should be lightly stirred round the young plants to break any crust which may have formed, and the tobacco fertiliser distributed by hand to each hill.

Transplanting machines are coming into general use where cultivation is organised upon an extensive scale. Among others the "Bemis Transplanter" opens a drill, places a small quantity of fertiliser with each plant, moistens it with a jet of water, and finally earths up the drill. The plants are inserted by two operators seated at the back of the machine close to ground level. The capacity of this very useful implement is some five acres in the day.

Annual Report of P.V. Surgeon.

THE following is the Annual Report of the Principal Veterinary Surgeon, submitted by him to the Minister of Agriculture:—

Hon. Minister of Agriculture,—

Sir,—I have the honour to present to you my yearly report for the period 1st July, 1906, to 30th June, 1907.

During the early part covered by the period of this report, work in connection with the Native Rebellion was still being carried out by my Department in connection with transport animals, and more particularly as regards the testing of animals for glanders.

With the discharge of the Militia transport wagons, a considerable amount of work in connection with the inspection of these oxen had to be undertaken; and, owing to the suspicion that many of these animals might possibly have come in contact with infected East Coast Fever veld, all cattle which had at this time been engaged on Militia transport work, and all animals which had been part of the loot stock, had to be traced up and quarantined. As these animals had been distributed all over the Colony, this necessitated a considerable amount of work.

With regard to those transport animals which had been taken into Zululand from Natal: These were not allowed to return until they had passed through a temperature camp on the borders of Natal. Such a precaution was, in our opinion, necessary, as there was a possibility of their having been in contact with infected veld in Zululand unknown to us. The wisdom of such a course was proved by the fact that some four or five animals were found to be infected with East Coast Fever, and in consequence the animals were not allowed to enter Natal, but were, I understand, taken over by the Government in Zululand.

It was anticipated, when military operations commenced in Zululand, that cattle engaged with transport there would probably become infected with East Coast Fever. Accordingly, from our knowledge of the probable distribution of the disease, my Department advised that all wagons possible be commandeered in Zululand and that those which had to be taken from Natal to make up the deficiency be purchased outright and not taken over with a guarantee that they would be paid for until such time as they returned to the owner's farm. If this had been carried out the payment for hire for a long period with the subsequent purchase of these oxen would have been avoided. It was further considered necessary by my Department that all areas in which military operations had been conducted both in Zululand and in parts of Natal adjacent to that Province should be placed in quarantine in order that we should have the power to

refuse permission for any cattle to leave such areas until they had been subjected to such conditions as would ensure their freedom from infection. This was considered particularly necessary in that portion of Natal between the Umvoti and Tugela Rivers, for although at this time we had no reason to think that East Coast Fever existed there, yet with the movement of transport cattle which had taken place from Zululand it was considered advisable to take such precautions. As this quarantine was not imposed, all we could do was to inspect cattle prior to their being discharged from transport service, which, from an East Coast Fever point of view, is of very little value, but which imposed upon the Department a considerable amount of work.

STAFF.

The professional staff during the year was as follows:—S. T. Amos, M.R.C.V.S., Durban; G. S. Bruce, M.R.C.V.S., Dundee; A. J. Beckett, M.R.C.V.S., Vryheid; C. H. Cordy, M.R.C.V.S., Greytown; A. F. Harber, M.R.C.V.S., Maritzburg; F. Hutchinson, M.R.C.V.S., Newcastle; J. McNeill, M.R.C.V.S., Newcastle and Verulam; O. A. O'Neill, M.R.C.V.S., Ladysmith; W. M. Power, M.R.C.V.S., Maritzburg; C. M. Sharpe, M.R.C.V.S., Bulwer and Port Shepstone; Chas. Tyler, M.R.C.V.S., Port Shepstone and Vryheid; F. A. Verney, F.R.C.V.S., Mooi River; J. L. Webb, F.R.C.V.S., Ixopo and Ladysmith.

Mr. Beckett has been transferred from my Department to that of the Government Bacteriologist. Mr. O. A. O'Neill left the Department on the 16th October, 1906. Mr. J. Donaldson, M.R.C.V.S., was appointed to take Mr. O'Neill's place; and Mr. C. H. Strachan has been appointed to take the place of Mr. J. McNeill, whose period of service expires on the 7th July, 1907.

STOCK INSPECTORS.

The following changes have taken place in the Stock Inspectors' appointments:—

In Umvoti County one Stock Inspector has been appointed to take charge of the whole of Eastern Umvoti and Krantzkop districts, to reside at Greytown, in the place of two Stock Inspectors in the past. The Stock Inspectorship of the Magisterial Division of Umlazi was abolished, this district being added to that of Durban Borough.

I regret to have to record the injuries received by Mr. Robbins, late Stock Inspector for the Magisterial Divisions of Lower Tugela and Mapumulo, during the late rebellion, which necessitated his relinquishing the post of Stock Inspector.

RINDERPEST.

There have been no cases of this disease in the Colony during the period of this report.

SHEEP SCAB.

During the year under review outbreaks of scab occurred as follows:—

Newcastle, 10; Dundee, 6; Ladysmith, 37; Bergville, 12; Estcourt, 33; Weenen, 21; Western Umvoti, 10; Eastern Umvoti, 18; New Hanover, 4; Krantzkop, 6; Upper Umkomanzi, 2; Umgeni, 5; Lion's River, 12; Polela, 12; Underberg, 11; Ixopo, 3; Harding, 6; Utrecht, 7; Vryheid, 17; Ngotshe, 3; Paulpietersburg, 4; Melmoth, 2; Nqutu, 50.

For the year ending 30th June, 1907, the number of outbreaks totalled 291, as compared with 295 during the previous year; but in last year's return are included the 50 outbreaks in the Nqutu district of Zululand. These 50 cases shown do not represent 50 actual fresh outbreaks of the disease, but the outbreaks shown to exist amongst the sheep of the different native owners; and in many cases it happens that, owing to the overlapping in the grazing and the indifferent herding of the sheep, one actual outbreak is responsible for the infection of the sheep of many owners. The natives in this district have for some time past given a considerable amount of trouble with scab in their sheep, and during last year matters had to be allowed to take their course owing to the native rebellion which existed in this locality for several months. Since matters have been quiet, however, the Stock Inspector has endeavoured to take energetic measures to suppress these outbreaks of scab, but the difficulty experienced has been in arranging for the satisfactory dipping of the sheep of the several owners, as, of course, none of them possess dipping tanks. In many cases the Stock Inspector has himself been compelled to personally dip the sheep; and, of course, in all cases very little good is done unless the Inspector himself supervises the dipping. Latterly, owing to the presence of work in connection with East Coast Fever, all the time which it is desired should be given to this question of sheep scab could not be devoted to it.

The number of outbreaks of scab which have occurred in Northern Natal have again this year shown a marked decrease, notwithstanding the fact that Natal carries a very large number of sheep from the Orange River Colony during the winter months—when, as is generally known, this disease is more prone to make itself evident. As previously stated, this falling off in the number of outbreaks is undoubtedly due to the carrying out of proper scab regulations in the Orange River Colony which did not exist a few years ago, and when—as ample proof can be shown—flocks of sheep actually infected with scab were brought into Natal regularly in the autumn.

INTER-COLONIAL VETERINARY CONFERENCE.

In March last an Inter-Colonial Conference was held with reference to the movement of stock from one Colony to another, particularly in regard to the movement of sheep, and on this latter question the following resolutions were passed:—

1. "That all restrictions hitherto placed on the movement of sheep

and goats for the purpose of preventing the spread of East Coast Fever should be withdrawn."

2. "That mutual ports of entry for the introduction of small stock should be established and that the cost of establishment and maintenance of such mutual ports should be divided between the Colonies using such ports."

3. "That all sheep or goats travelling by road from one Colony to another, except those entering another Colony under special regulations for the purpose of summer or winter grazing, should be dipped at the port of entry and allowed to enter after being examined and passed as visibly free from disease by a competent officer on the condition that a second dipping be carried out within a period to be prescribed by the receiving Colony."

4. "That all sheep or goats exported from one Colony to another by rail should be certified to be clean by a Government Veterinary Surgeon or Inspector of Stock in the Colony from which they are exported, should be dipped once under the supervision of such Inspector, and should pass the port of entry within ten days of such dipping. At the port of entry the sheep or goats should be examined by the Inspecting Officer, who should allow them to proceed to their destination, if he finds them dipped, free from scab, and their certificate in order; and, on reaching the detaining station or on arrival at destination as the receiving Colony concerned may prescribe these sheep or goats should again be dipped under supervision within a period of not more than 16 days from the date of the first dipping. This resolution is not intended to affect any Colony through which sheep or goats may pass by rail in transit from one Colony to another."

5. "That sheep or goats intended for immediate slaughter purposes should be admitted by rail under the same conditions as others, except that they may be exempted from being dipped on arrival at their destination, provided they are accompanied by a declaration that they are intended for slaughter within 10 days of being admitted and provided that they be found plainly branded on the back with a distinctive brand to be hereafter decided upon."

6. "That sheep or goats certified by the owner to be intended for exhibition purposes and accompanied by a certificate of health signed by a Government Veterinary Surgeon or Stock Inspector, should be allowed to pass from one Colony to another by rail without dipping, provided they are declared as visibly clean by the Inspector at the port of entry, and provided a copy of the certificate is previously posted to the Agricultural Department of the receiving Colony."

7. "That well-bred sheep or goats intended for sale for stud purposes (the onus of proof of which intention shall rest with the consignor) should be allowed to enter another Colony by rail without being previously

dipped in the exporting Colony, provided they are accompanied by a certificate from a Government Veterinary Surgeon or Stock Inspector that all the sheep or goats on the farm from which the said stock have been taken have been free from scab for twelve months or longer."

8. "That thoroughbred sheep or goats from oversea, if passed as clean by a Veterinary Surgeon or Stock Inspector at the port of landing, should be allowed to proceed to another Colony without being dipped, provided that if any delay occurs in transit, the owner be furnished with a certificate from the Government Veterinary Surgeon or Stock Inspector that such sheep since landing have remained clean and have not, to the best of his knowledge, come in contact with any diseased sheep or premises."

9. "That exporting Colonies should bind themselves to receive back into their territory from the port of entry infected sheep or goats found travelling by road or by rail therefrom, without imposing any restrictions upon their re-introduction, if such a course be considered desirable by the authorities of the Colony to which the sheep are consigned."

10. "That for the dipping of sheep or goats at the various ports of entry a preparation of lime and sulphur be used. Such preparation to be approved by the Governments of the various Colonies."

11. "That this Conference is of opinion that the Governments of the various Colonies should combine in order that experiments may be conducted with a view to recommending one dip which shall be considered as an efficacious scab-destroying preparation and which shall embody preventive as well as curative properties."

These resolutions cover most of the ground required in connection with the movement of sheep from one Colony to another with every regard to the Colony receiving the sheep and with a view to making such necessary regulations as convenient and as practicable as possible to the sheep owners.

With the Cape Colony and the Transvaal I was able to arrange for sheep entering or leaving Natal for winter or summer grazing to do so without passing through a port of entry and without being dipped, provided they were accompanied by a certificate from the exporting Colony to the effect that they had been inspected by a Government Veterinary Surgeon or Stock Inspector within ten days of crossing the border and were free from scab. I regret to say, however, that we have been unable to come to the same arrangement with the Orange River Colony. At the Conference at Bloemfontein neither the Director of Agriculture nor the Chief Inspector of Scab was present, which is somewhat remarkable, as the Conference dealt in particular with the inter-colonial movement of sheep; and during my visit to Bloemfontein I was unable to get any definite statement that sheep would be permitted to enter the Orange River Colony from Natal for summer grazing on the lines above stated. I informed them that the Natal Government was prepared to accept their

certificates and to dispense with the dipping on arrival at their destination if they would meet us in the same way, and that, further, the Natal Government was prepared, for the period during which sheep were returning to the Orange River Colony, to appoint temporary additional inspectors to ensure more thorough inspection and to avoid inconvenience to sheep owners. The Orange River Colony authorities have since intimated to us that they are not prepared to make a definite statement to the effect that sheep returning for summer grazing will be accepted on certificate only.

EAST COAST FEVER.

During the period of this report there have been outbreaks of this disease as follows:—Paulpietersburg, 25; Vryheid and Ngotshe, 68; Dundee and Umsinga, 27; Ladysmith, 5; Muden, 2; Umvoti, 3; Durban County, 27; Alexandra County, 1; Lower Tugela and Mapumulo, 30 (whole districts now considered infected); Zululand, 50 (whole districts of Nongoma and Mahlabatini now considered to be infected).

The disease was first known to exist in Natal proper in August of last year, and in my monthly report for August, appearing in the September issue of the *Agricultural Journal*, the whole position as regards the outbreaks in Durban County and in the district of Dundee is reviewed. During the whole year the position as regards this disease has been stated as fully as possible in each issue of the *Agricultural Journal*, and weekly returns giving the number of fresh outbreaks and the number of deaths have appeared in the local press.

As is generally known, when the disease invaded Natal proper and became more generally distributed (chiefly through the movement of stock which took place during the recent native rebellion), the policy of stamping out was urged upon the country, as it was recognised that, although up to that date we had been able to remove cattle from infected veld and its vicinity by means of temperature camps, yet with its appearance in the more populated districts of Natal this no longer became practicable, and it was urged that the only possible method of stamping out the disease was by the removal of the cattle from the infected and the adjacent veld for slaughter. However, as it is now to be regretted, this stamping out system was not adopted, but a policy of quarantine, fencing, and, later on, branding, was resorted to, and the disease continued to make progress in the infected and adjacent areas.

In my monthly report for November, which appeared in the December issue of the *Agricultural Journal*, the several methods of dealing with this disease were discussed at length. It is now the intention of the Government to ask for legislative powers to deal with East Coast Fever by the compulsory removal for slaughter of all cattle from infected and veld which is considered to be in-contact, and in addition to ask for a Compulsory Fencing Act in the sense known to us for dealing with East

Coast Fever. Should these powers be conferred upon the Government, and a sufficiently broad view be taken as to what must constitute in-contact cattle, we should see an improvement as regards the spread of East Coast Fever within a few months after such powers come into force.

In carrying out this stamping-out policy the most difficult part will be in determining (without removing many cattle unnecessarily) what cattle should be considered as in-contact. Such duties should only be entrusted to an experienced D.V. Surgeon, who not only has a knowledge of the district but who knows from experience what are most likely to be cattle running on possibly infected veld. In any case, in-contact cattle (if we are to hope to be as successful as possible in adopting this policy) must be decided upon by a responsible Government official who has no other interest in the district than his department. With the greatest of care there will, no doubt, be some cattle taken which might have been left, and some left which might have been taken, but our object must be to reduce such cases to a minimum.

The determining of in-contact cattle is often rendered more difficult in this country owing to the absolute lack of information as regards the movement of stock which may have taken place, and this applies in particular to the stock of natives. We know that even in districts where movement is prohibited and a large amount of money is expended on guards, quarantine officers, etc., movement can still be carried on by unscrupulous persons without being detected; and it is for this reason that, although we may apparently deal with all the in-contact cattle in connection with any particular outbreak, yet we are almost sure to find fresh outbreaks cropping up even after this stamping-out policy has been carried out for some little time. The advantage of having the power of stamping-out, however, lies in the fact that we can immediately dispose of such isolated outbreaks in many cases before there is any possibility of infected cattle having been removed.

The necessity for and the advantage of having a Compulsory Fencing Act to work with in connection with this compulsory slaughter of cattle, lies in the fact that in many cases we shall be able to avoid moving cattle from areas adjacent to infection by insisting upon such areas and farms being fenced to our satisfaction.

In deciding on in-contact cattle, existing fences will be considered as one of the chief recommendations in allowing cattle to remain, but it must be clearly understood that a fence is only of value in connection with East Coast Fever in so far as it stops the movement of cattle, and if any suspicious history of the movement of cattle has taken place adjacent to a fenced farm or fence area, then such cattle would probably have, in some cases, to be considered in-contact and have to be removed. It will be in such cases that the Department will be most severely criticised and that the owners will consider they have been most hardly dealt with,

Apart from the fact that areas can be fenced, and the cattle in some cases allowed to remain thereon, a Compulsory Fencing Act is required to compel the fencing-in of areas even after the cattle have been removed; and this will be the most difficult part to enforce, as the owners of such farms will feel that they no longer have cattle to protect and, therefore, should not be called upon to fence their properties.

If the stamping-out process is to be a success, it will be apparent that it is just as necessary to take steps to prevent animals returning from or straying on to infected veld before it is clean as it is to remove animals from infected veld. I think there is no doubt it will be the removal of in-contact cattle that will be met with the greatest opposition, as the majority of people who have not actual infection among their cattle cannot be persuaded that their animals are probably in-contact and probably running on infected veld. If the stamping-out policy is to be a success, when cattle are impartially considered to be in-contact they must be removed, notwithstanding any political exigencies that may tend towards their non-removal.

Some few months ago many people in the Colony would not believe the existence of East Coast Fever or that it was any different to the ordinary redwater. We are glad to note now that this idea has fallen through, and the country now realises it is faced with a most serious disease, and one which, if not properly handled, will seriously affect the farming interests of this Colony for many years to come.

During the period covered by this report many alleged cures for the disease have been tried, all with the same result, viz., failure.

The movement of cattle in those districts which have been placed in quarantine, and in which movement is permitted, has been controlled by the permit system, which system has been found to work well and to cause the least amount of inconvenience to the public consistent with its proper carrying out. During the period of this report, 6,511 permits have been issued for the removal of slaughter cattle, representing 16,349 head of cattle; 550 permits have been issued for the movement of cattle from one district to another. All the above permits have been issued from my office.

The system of local committees in the several districts has been found to work most satisfactorily and it is a pleasure to record the support and advice which we have received from the gentlemen who have been good enough to act on these committees.

In those districts where movement is allowed on permit from local Permit Officers, the gentlemen who have acted as such have undoubtedly given up a very great amount of their time in the 'public's interest and in the welfare of their district.

The deaths from East Coast Fever during the period of this report were as follows:—Paulpietersburg, 565; Vryheid and Ngotshe, 600;

Dundee and Umsinga, 771; Ladysmith, 72; Muden, 114; Umvoti, 29; Durban County, 1,043; Alexandra County, 20; Lower Tugela and Mapumulo, 5,600; and Zululand, 7,545. These deaths in Vryheid, Ngotshe and Zululand are only approximate.

The number of cattle moved for slaughter from the several districts from the 15th September, 1906, to the 30th June, 1907, amounts to 16,349, made up as follows:—

From.	To.	No.
Vryheid ...	Durban ...	3,002
do ...	P.M.Burg ..	635
Utrecht ...	Durban ...	102
do ...	P.M.Burg ...	29
do ...	Newcastle ...	54
do ...	Vryheid ...	100
do ...	Johannesbnrg ...	50
New Hanover ...	P.M.Burg ...	176
do ...	Verulam ...	84
Dundee ...	Durban ...	2,512
do ...	P.M.Burg ...	175
Upper Umkomanzi...	Durban ...	136
do ...	P.M.Burg ...	62
do ...	Verulam ...	29
do ...	Camperdown ...	5
Lower Tugela ...	Durban ...	1,077
Estcourt ...	Durban ...	488
do ...	P.M.Burg ...	841
do ...	Verulam ...	259
do ...	Howick ...	60
do ...	Estcourt ...	6
Lions' River ...	Durban ...	259
do ...	P.M.Burg ...	867
do ...	Howick ...	140
do ...	New Hanover ...	27
do ...	Verulam ...	12
Klip River ...	Durban ...	161
do ...	P.M.Burg ...	436
do ...	Dundee ...	4
do ...	Howick ...	8

From.		To.	No.
Ungeni	...	Durban	26
do	...	P.M.Burg	658
do	...	Verulam	15
Ixopo ...	...	Durban	489
do ...	...	P.M.Burg	34
do ...	...	Umzinto	74
do ...	...	Verulam	183
do ...	...	Richmond	12
do ...	...	Nottingham Road	12
do ...	...	Creighton	1
Umvoti	...	Durban	591
do	...	P.M.Burg	482
do	...	Verulam	22
do	...	Greytown	9
do	...	Stanger	3
Mid Illovo	...	Durban	44
do	...	P.M.Burg	20
do	...	Richmond	4
Newcastle	...	Durban	42
do	...	Newcastle	30
do	...	Hatting Spruit	3
Inanda	...	Durban	11
Stanger	...	Johannesburg	392
do	...	Durban	70
Alexandra	...	North Shepstone	4
Umlazi	...	Durban	43
Umsinga	...	P.M.Burg	22
Alfred ...	...	Durban	59
Polela ...	...	Durban	156
do ...	...	P.M.Burg	152
do ...	...	Verulam	20
do ...	...	Richmond	6
do ...	...	Creighton	1

From.	To.	No.
Lower Umzimkulu...	Durban ...	164
do ...	Verulam ...	36
do ...	North Shepstone ...	4
Pondoland ...	Durban ...	24
Zululand ...	Durban ...	502
do ...	P.M.Burg ...	88
do ...	Eshowe ...	40
do ...	Stanger ...	5
	Total ...	<u>16,349</u>

Cattle from infected districts are in all cases conveyed direct by rail in sealed trucks to approved abattoirs. The animals are temperatured before they leave the place on which they are running, such temperaturing being maintained daily until they are entrained. No animal is permitted to be removed from where it is running, and is at once destroyed *en route* if it shows a rise of temperature of 102·5 or over. The temperatures are taken in the early morning.

The amount of work under this head falling on my Department in this connection alone will be realised from the number of cattle forwarded from the several infected districts.

On arrival at the abattoir the cattle are removed from the trucks after the seals have been broken by an officer of the Department; and the animals are slaughtered within four days of arrival. All approved slaughter houses must be so arranged as to permit the animals being taken direct from the trucks into kraals constructed of 7 feet galvanised iron. The trucks conveying these animals are disinfected, and no hides, etc., are allowed to leave the abattoir until they have been thoroughly disinfected or salted for a period of eight days. This conveyance of cattle from infected districts through clean districts to abattoirs has received a considerable amount of criticism from some sections of the public, and it is admitted that, until one makes himself acquainted with all the details in connection with this transporting of cattle, and the means by which East Coast Fever is spread, there would appear to be danger attached to it. The only danger, however, in our opinion, is the possibility of a train meeting with an accident and cattle being liberated from the ever-turning of the trucks; but it is thought, through the enormous benefits accruing to the individual cattle-owners in the infected districts and to the Colony generally by the disposal of these cattle for slaughter, we are justified in taking such risk. It has been argued that infected ticks may leave the trucks *en route*, but it must be remembered that, to

start with, cattle with normal temperatures only are forwarded. It might, of course, happen that where animals are two days *en route* they may travel one day with a temperature, but even so it is extremely doubtful whether animals in this early stage of the disease are capable of transmitting the infection to the tick; and even allowing of this possibility it is known in practice that ticks are not disposed to leave animals under such conditions as falling on the bottom of a railway truck (any one who cares can observe this by stabling an animal and watching how often the ticks fall off their host while under such conditions). Presuming infected ticks may drop off an animal on to the floor of a truck their chance of escape from the trucks is remote, as the openings which may exist along the floor of the trucks (the majority of the trucks have no openings) quickly become plugged up by manure, and the tick which is responsible for the spread of East Coast Fever when falling off its host in the natural state is not in such a condition as to be capable of travelling any distance at all. Apart from this, assuming that an infected tick may escape from a railway truck, it escapes on the permanent way between two fences. If we were to be debarred from taking any practical steps to lessen the loss from East Coast Fever by circumstances such as the possibility of infected ticks escaping from railway trucks, then I fear we should not be able to make any real headway against the spread of the disease, as persons in an infected district, with the only outlook of annihilation, would probably be more disposed to seek illegal methods of removing their cattle.

(To be continued.)

The habit known as "wool-sucking" is a phase of perverted appetite in the lamb, and, when observed, should be checked, as it is very likely to prove fatal. The lamb begins by sucking the wool round the teat of its dam, and, as Veterinary-Colonel Nunn suggests, liking the saline taste, perseveres in the habit, even going so far as to eat the fleece of its companions. Lambs of about six weeks are more prone to the habit than younger or older animals, says the *Live Stock Journal*, and it is most common among those of the long-woolled breeds, Cotswolds or Merinos. The wool sucked or nibbled off forms into balls about as big as marbles when swallowed, and these balls block up the small bowel where it passes out of the fourth stomach. Even if the lamb does not die, the digestive arrangements are so disturbed that the animal loses condition, and remains small and stunted.

Tobacco Growing.

IN his last issued report, Mr. Hannon, the Superintendent of Agricultural Co-operation at the Cape, states that the cultivation and treatment of the tobacco crop is peculiarly suitable to methods of combination for its successful management. The matter has been discussed in several districts of Cape Colony, and a good deal of interest has been aroused in flue drying, and generally the more efficient treatment of this valuable crop. It is absolutely necessary, Mr. Hannon points out, that some system of itinerant instruction in tobacco culture, and in the preparation of the leaf to suit the requirements of South African manufacturers, should be introduced, as at present there is no uniformity whatever observed in the different parts of the country in any branch of tobacco culture. The manufacturers consider that, with a little more care, the price of tobaccos for their purposes could be raised from 50 to 100 per cent., and the various experiments undertaken by the Cape Agricultural Assistant have clearly demonstrated the capability of the soil and climate of that Colony to produce a leaf of very high quality.

On the subject of the development of the tobacco industry, the following extracts from Mr. G. R. Freeman's report on the samples of tobacco forwarded to the South African Products Exhibition in London, should prove of interest to Natal readers:—

"I would strongly recommend the South African farmers to give the matter of tobacco culture (which includes all the other processes of curing and packing) a vast deal more care and attention in the future than they have done in the past. Judging from all the samples shown, the whole business is conducted in a most slipshod, haphazard fashion, whereas with care they should rival Sumatra, a Dutch Colony, where tobacco was grown for the first time only thirty years ago, and where some of the plantations pay annually 300 to 400 per cent. on their capital outlay. They have proved more profitable than most gold mines, and prices for good tobacco are ruling higher than ever this year.

"For the purpose of cigar-making there are three distinct classes of tobacco required, viz.: (1) Filler, or the broken leaves used in the interior of the cigar; (2) binder, or coarse leaf, used to hold filler roughly in shape in preparation for (3) the cover or wrapper, which is the only part seen by the purchaser.

"The filler should be a tobacco of about six to ten inches in length, not necessarily very sound or unbroken, containing not more than 16 per cent. of stalk, and must be of good quality. For this grade Havana tobacco is unrivalled, and fetches from 1s. 6d. to 3s. per lb. exclusive of duty.

"The binder or bunch wrapper most used is a seed tobacco grown in the United States, or a somewhat similar tobacco grown in Germany. These are rough but sound tobaccos, mostly of excellent burning, and, except the German, of a neutral flavour. These tobaccos are usually sold without stalk (*i.e.*, stemmed), and realise from 1s. 3d. to 1s. 9d. per lb.

"The cover leaf should be of a clean and silky texture, of a clear greyish and light brown colour, not marbled or double coloured. It must burn evenly and white, hold the fire and ash, and the flavour must be good or neutral. The covers most in vogue, and which largely fill above requirements, are Sumatra, Borneo, and Java, all East Indian tobaccos, but necessarily varying considerably in quality, quantity, and price. A good cover will fetch from 1s. 6d. to 10s. per lb.

"It should be borne in mind that the tobaccos required for cigar, cigarette making, or pipe purposes, are all of them absolutely distinct. The atmospheric conditions, the soil, cultivation, or treatment, are for each class quite different, and require the services of special experts to advise and superintend. Such experts can only be obtained by payments of high salaries, but the expense could be divided between a district or Colony and services charged *pro rata*.

"At any rate, if tobacco is to be grown successfully, the rough-and-tumble methods of 200 years ago must be abandoned, and the up-to-date and scientific cultivation of successful competitors be copied.

"I feel confident that any care spent on cultivation will be more than repaid, and that, should South Africa succeed (and there is every reason to believe she can do so) in producing tobaccos to fill any of the above requirements, I am convinced that my manufacturers here will gladly welcome such, and give their fellow-countrymen a full share of the profit of this cultivation, which is now all practically absorbed by the foreigner."

Some say it is bacteria
That makes our milk test bad,
And that we must make war on them
So buyers won't get mad.
But I contend for cleanliness
In words both strong and curt,
For everything that gets in milk
Is just plain dirt.

M. G. K. in the *American Agriculturist*.

Agricultural Acts, Session 1907.

THE following are the main provisions of the Acts affecting agriculture passed by Parliament during the Session just concluded:—

ACT No. 6. 1907.

"To provide for the compulsory fencing of lands within the Colony of Natal" (the East Coast Fever Fencing Act, 1907).

2. (a) For the purpose of preventing the spread of the cattle disease known as East Coast Fever, and notwithstanding anything contained in the Fencing Law, 1887, or the Laws and Acts amending the same, the Minister of Agriculture may, with the approval of the Governor in Council, cause to be erected fences along the boundaries of any farms within an infected or suspected area or of any native location or of any town lands within such area. (b) The term "fence" in this Act shall mean a fence approved by the Minister of Agriculture.

3. (1) The cost of erecting any fence along the boundaries of any farm shall be in the first instance defrayed out of moneys voted by Parliament. Such cost shall be repaid, together with interest thereon at the rate of five per centum per annum, by thirteen yearly instalments, the first payable two years after the fence is completed. Such instalments shall be calculated and fixed so that the said cost with interest thereon shall be wholly repaid within a period of thirteen years from the date on which the first instalment falls due. (2) Such repayments of cost and interest shall be made by the owner of any farm fenced under the last preceding section or if the fence divides the farms of adjoining owners then each such owner shall pay one-half the cost of the part of the fence dividing such farms together with the interest aforesaid. (3) The term "owner" in this and the following sections shall mean the person registered as the owner in the office of the Registrar of Deeds, and the term "farm" shall include any portion of a farm. (4) Should any farm or area be bounded by any river bank, donga or spruit, the Minister of Agriculture shall have the power to erect the fence along some more convenient line. In such event the cost of the fence shall be borne solely by Government, who shall have the right to dispose of or remove the same when desirable. (5) Where the adjoining land is Crown land or held by the Natal Native Trust, the Government, or the Natal Native Trust, as the case may be, shall bear one-half of the cost of the fence.

4. The Minister of Agriculture shall notify in writing to the Registrar of Deeds the amount due by any owner under this Act, and the Registrar of Deeds shall upon receipt of such notification note the said

amount in the Land Register and shall deliver to the Minister of Agriculture a certificate setting forth such amount and the date of the note. The cost of such fencing shall be a first charge and lien in favour of the Government upon the land so fenced, and such lien shall have priority over any existing mortgage thereon. An entry shall be made by the Registrar of deeds in the Public Debt Register of the particulars of such debt due to the Government, and of the lien upon the land.

5. Where any such farm aforesaid held under lease has been enclosed by a fence erected under this Act during the term of the lease, the lessors shall be entitled to receive from the lessee as from date when such farm became so enclosed a payment of five per cent. per annum on any sum he may have paid to the Minister of Agriculture under Section 3, and such payment shall be made with the rent of the farm and shall be deemed in law to be part of such rent.

6. Whenever the Minister of Agriculture shall have incurred any cost in respect of the fencing under this Act in respect of any town lands which may have become vested in the Corporation of any Borough or the Local Board of any Township, the cost shall be repayable by such Corporation or Local Board in the manner provided by Sub-section 1 of Section 3 of this Act.

7. Nothing in the foregoing sections shall be deemed to prevent any person liable for the cost of the erection of a fence under this Act from contributing approved material or labour or transport towards the cost of such fence, and any such contribution shall be set off against the amounts mentioned in the said sections respectively according to a value to be determined in the absence of agreement by the Magistrate of the district.

8. The Minister of Agriculture may cause to be fenced (1) Any roads, whether public or private, traversing any part of the Colony; (2) Any boundaries of the Colony or outspan in the Colony; and the cost of any fence erected under the powers of this section may be defrayed entirely out of the moneys voted by Parliament for the purposes of this Act.

9. This Act shall be read and construed in conjunction with the provisions of the Fencing Law of 1887 and the amending Acts so far as the same may be applicable thereto; and the Minister of Agriculture shall have power to direct owners to properly maintain and keep in good repair any fences; and, failing their compliance, he may carry out such repair at the owner's cost, subject to the provisions of Section 3 of this Act. No person shall remove or in any way interfere with any fence erected or maintained under authority of this Act.

10. The Governor in Council may from time to time make regulations, and any person who shall contravene such shall, upon conviction in the Court of a Magistrate, be liable to a fine not exceeding Ten Pounds (£10), or in default to imprisonment with or without hard labour for a period not exceeding one month.

11. Any person who shall contravene Section 9 of this Act shall, upon conviction in the Court of a Magistrate, be liable to a fine not exceeding Twenty-five Pounds (£25), or to imprisonment with or without hard labour for any period not exceeding six months.

ACT No. 7, 1907.

"To amend Act No. 53, 1906, entitled Act 'To authorise the Governor to borrow the sum of £100,000 from the Consolidated Loans Fund, to be used for the prevention or suppression of the disease known as East Coast Fever.'"

1. Section 3 of the Act No. 53, 1906, is hereby repealed, and the following substituted therefor:—

The purposes to which this Act applies are as follows:—

- (1) Loans to owners of cattle or others who are in need of such assistance for fencing their lands, for purchase of transport animals or otherwise for the prevention or suppression of the disease known as East Coast Fever.
- (2) The purchase by the Government of such donkeys, mules, horses, wagons or gear as may be necessary for the establishment of a transport service in any district in which the movement of oxen may be prohibited under the provisions of the East Coast Fever Act, No. 32, 1903, and all amending Acts which are now in force and any regulations made thereunder.

ACT No. 8, 1907.

"To amend Act No. 32, 1903, entitled Act 'For preventing the spread of the disease known as Rhodesian Redwater.'"

1. The following clause shall be added to Act No. 32, 1903:—

The Minister may at any time when he considers it necessary to, do so in order to prevent the spread of the disease, order the removal of cattle from an infected area or from any place adjacent to an infected area, and dispose of them for immediate slaughter: Provided, however, that the owner of any such cattle shall have the alternative of disposing of the whole of the same by private treaty, for slaughter, within one week after notice has been given him in writing. If the owner shall so dispose of such cattle he must conform to all Government requirements, and all rules and regulations which may be in force regarding the removal of cattle. Cattle so taken shall be paid for at the rates specified in the Schedule to this Act.

2. The Schedule to Act No. 54 of 1906 is hereby repealed, and the following Schedule enacted in lieu thereof, namely:—

SCHEDULE.

	£	s.	d.
Yearling oxen or bulls, up to	2	0	0
Yearling heifers, up to	3	0	0
2 year old oxen or bulls, up to	3	0	0
2 year old heifers, up to	4	0	0
3 year old oxen or bulls, up to	4	0	0
3 year old heifers, up to	5	0	0
Cows, 4-8 years, with calves, up to	7	10	0
Cows, 4-8 years, without calves, up to	6	10	0
Oxen, over 4 years, up to	7	0	0
Cows, 8-12 years, with calves, up to	6	0	0
Cows, 8-12 years, without calves, up to	5	0	0
Old cows, with calves, up to	4	0	0
Old cows, without calves, up to	3	0	0
Bulls, 4 years and over, up to	4	0	0

ACT No. 14, 1907.

"To amend Act No. 27, 1899, entitled 'Act to provide for the inspection and examination of cattle arriving in this Colony by sea, and to prevent the introduction of the disease of tuberculosis.'"

1. This Act shall be read and construed together with Act No. 27, 1899, hereinafter called the principal Act.

2. The words "or land" shall be inserted after the words "by sea" in the second section of the principal Act.

3. Sections 4, 5, and 6 of the Principal Act are hereby repealed, and the following substituted therefor:—

All cattle imported into Natal by sea save those accompanied by certificates given by qualified Veterinary Officers approved of by the Minister of Agriculture, shall upon their arrival be quarantined until tested by the Examiner with tuberculin, and shall not be released from such quarantine until the Examiner certifies them to be free from any reaction indicating their being infected with tuberculosis in the form of the schedule to this Act.

Cattle imported into Natal over any inland border, may, at the discretion of the Minister of Agriculture, be required to be placed in quarantine at the place of entry, or upon their arrival at their destination, and there be tested with tuberculin by an officer of the Veterinary Department, and shall not be released from such quarantine until they are certified by such officer to be free from any reaction indicating their being infected with tuberculosis in the form of the schedule to this Act.

4. Section 7 of the principal Act is hereby repealed, and the following substituted therefor:—

In the event of any such animal proving to be affected with the disease of tuberculosis it shall not be removed alive from the quarantine station, but shall be destroyed there: Provided that the owner may in cases of animals imported by sea have the option of returning or re-shipping the animal, in which case it shall be taken direct from the quarantine station to the vessel.

5. The words "or land" shall be inserted after the words "by sea" in Section 12 of the principal Act.

6. Any cattle which may have been allowed to land under the 13th Section of the principal Act, shall be inspected and branded with a suitable brand decided upon by the Principal Veterinary Surgeon, and shall be slaughtered within a period of one calendar month from the date of landing in the Colony.

In the case of cattle so imported coming from countries where tuberculosis is known to exist such cattle shall be quarantined until slaughter and their carcasses or any part thereof shall not be removed until they have been passed, as fit for human consumption, by a Government Veterinary Surgeon.

If any such cattle are not slaughtered within one month, or within such longer period as may be granted by the Principal Veterinary Surgeon, the owner shall be liable in respect of each animal to a penalty as provided in Section 12 of the principal Act.

ACT No. 15, 1907.

"To amend the Lung sickness Prevention Act of 1897."

1. The word "owner" as used in the Lung sickness Prevention Act of 1897 (hereinafter called the principal Act) shall include a partnership, company, or corporation.

2. The word "lung sickness" shall mean the disease known as contagious pleuro-pneumonia in animals of the ox tribe.

Section 3 of the principal Act is amended accordingly.

3. The appointment of inspectors of cattle shall be made by the Minister of Agriculture and not by the Governor in Council or by the Governor, as provided under Sections 5 and 6 of the principal Act.

4. Section 8 of the principal Act is hereby repealed, and the following is enacted in lieu thereof:—

In the event of any herd being declared by a Government Veterinary Surgeon or such Inspector to be infected with the disease of lung sickness, the owner of such herd shall be granted a license, conforming as near as may be to the form of license set forth in Schedule B, to keep such cattle for a period of three months for the purpose of drenching or inoculating

the herd and at once destroying any animal which a Government Veterinary Surgeon or Inspector declares to be showing symptoms of lung sickness. Every such license shall contain a condition that the cattle thereby licensed shall, at the owner's option, be at once drenched or inoculated to the satisfaction of the Inspector, and that all animals showing symptoms of the disease shall be immediately destroyed. At the expiry of such license the Government Veterinary Surgeon or Inspector shall re-inspect such herd, and should there have been a case of lung sickness in such herd within the period of the license, the license shall be renewed for a further period of three months, dating from such last appearance, and such inspection shall be renewed every three months until such herd is found free from the disease. No cattle shall be allowed to be removed from the land on which they are licensed until the Government Veterinary Surgeon or Inspector shall declare the herd clean, under a penalty not exceeding Twenty-five Pounds Sterling, or, in default of payment thereof, to imprisonment not exceeding three months.

5. The notice required to be given by the owner under Section 9 of the principal Act shall be to the District Veterinary Surgeon or the Inspector, and not to the Magistrate as provided under the said section.

6. In the event of an animal being destroyed by the order of a Government Veterinary Surgeon or Inspector under the provisions of Section 4 of this Act, compensation shall be payable to the owner of such animal at the rates set forth in the Schedule A of this Act: Provided that in the case of the owner being guilty of any neglect in failing to report or of any undue delay in reporting an outbreak, no such compensation shall be payable.

7. Section 10 of the principal Act is hereby repealed, and the following is enacted in lieu thereof:—

All cattle so licensed shall be isolated by herding, or otherwise, at a distance not less than ten yards from the boundary of the property on which they are licensed, and from any public road.

For every breach of this provision the owner shall be liable, upon conviction in the Court of a Magistrate, to a fine not exceeding Thirty Pounds Sterling, or, in default of payment, to imprisonment with or without hard labour for any term not exceeding six months:

Provided that should it be proved to the satisfaction of the Government Veterinary Surgeon or Inspector in the case where a farm is intersected by a public road or roads, that it is absolutely necessary for licensed cattle to cross or be driven along such road or roads on such farm the Inspector is empowered to allow such removal under the restrictions contained in Section 13 of the principal Act.

8. Schedule B of the principal Act is hereby repealed, and the following is enacted in lieu thereof:—

SCHEDULE B.

I certify that a herd of (state number).....cattle belonging to on the farm in Ward County of are infected with lung sickness, and I hereby grant to the said license to keep the same for three months from date, for the purpose of complying with the conditions of Sections 8, 9, and 10 of Act No. 30, 1897, as amended by Act No., 1907, as endorsed hereon.

Dated at this day of 19....

Inspector.

SCHEDULE A.

	£	s.	d.
Yearling oxen, up to	2	0	0
Yearling heifers, up to	3	0	0
2 year old oxen, up to	3	0	0
2 year old heifers, up to	4	0	0
3 year old oxen, up to	4	0	0
3 year old heifers, up to	5	0	0
Cows, 4-8 years, with calves, up to	7	10	0
Cows, 4-8 years, without calves, up to	6	10	0
Oxen, over 4 years, up to	7	0	0
Cows, 8-12 years, with calves, up to	6	0	0
Old cows, with calves, up to	5	0	0
Old cows, without calves, up to	4	0	0
Bulls, under 4 years, up to	3	0	0
Bulls, over 4 years, up to	4	0	0

ACT No. 28, 1907.

"To amend Act No. 44, 1904, entitled Act 'To aid and encourage the agricultural development of Natal.'"

1. Section 12 of the Agricultural Development Act No. 44, 1904, hereinafter called the principal Act, is hereby repealed.

2. The following clause shall be added to Section 34 of the principal Act:—

An allottee shall be entitled, on satisfying the Board that he has beneficially occupied the block held by him for a period of fifteen consecutive years, to a grant in freehold of the block so occupied, on such terms as to payment of purchase price as the Governor in Council may decide on the advice of the Land Board.

3. The following clause shall be added to Section 36 of the principal Act:—

The allottee shall be entitled, on satisfying the Board that he has beneficially occupied the block held by him for a period of fifteen consecutive years, to a grant in freehold of the block so occupied, on such terms as to payment as the Governor in Council may decide on the advice of the Land Board.

ACT No. 29, 1907.

"To prohibit the Export of Ostriches and Ostrich Eggs."

2. It shall not be lawful to export any ostrich or ostrich egg, except as hereinafter provided, to any place beyond the limits of this Colony, or to any country separated therefrom by sea: Provided, however, that this prohibition shall not apply to the export of any ostrich or ostrich egg to any neighbouring Colony or State which shall, by its own Legislature, have similarly prohibited the exportation of ostriches and ostrich eggs, subject to the aforesaid exemption, to any neighbouring Colony or State, and under a penalty not less than that provided for by this Act: And provided also that nothing in this Act shall prevent the export of the shells of ostrich eggs the contents of which have been removed, or of ostrich eggs which have been rendered unfertile, provided that in the latter case a permit to export shall have been obtained from the officer appointed by the Government for that purpose.

3. Every person who shall contravene the provisions of this Act by exporting any ostrich or ostrich egg (except as hereinbefore excepted), shall on conviction be liable to imprisonment with or without hard labour for any term not less than twelve months nor more than two years.

4. All penalties under this Act may be enforced in the Court of the Magistrate of the Division in which the offence was committed.

"Success don't consist," says a Yankee sage, "in never making blunders, but in never making the same ones twice."

Moving parts on new machinery frequently run hard on account of paint in the bearings. This paint can be easily removed by the use of paraffin, or one-half paraffin and one-half machine oil mixed. New machines should be carefully examined every day, as bolts often work loose or boxes may fit too tightly, causing them to heat.

Cape Wool Export.

THERE are twenty-one Wool Associations now in existence in the Cape Colony which have agreed to adopt the regulations laid down by the Executive of the National Association of Wool and Mohair Growers and which have endeavoured to carry out during the past season the methods of improvement approved of by that body. They are:—

Barkly East Co-operative Wool-growers' Association.
 Bedford Co-operative Wool-growers' Association.
 Beaufort West Co-operative Wool-growers' Association.
 Burghersdorp Co-operative Wool-growers' Association.
 Calvinia Co-operative Wool-growers' Association.
 Cradock Co-operative Wool-growers' Association.
 Caledon Co-operative Wool-growers' Association.
 George Co-operative Wool-growers' Association.
 Graaff-Reinet Co-operative Wool-growers' Association.
 Griqualand West Co-operative Wool-growers' Association.

(Kimberley).

Griqualand East Co-operative Wool-growers' Association.
 (Kokstad).

Hay Co-operative Wool-growers' Association (Postmasburg).
 Hope Town Co-operative Wool-growers' Association.
 Hanover Co-operative Wool-growers' Association.
 Highlands Co-operative Wool-growers' Association (Albany).
 Komgha Co-operative Wool-growers' Association.
 Kolberg Co-operative Wool-growers' Association.
 Sterkstroom Co-operative Wool-growers' Association.
 Uniondale Co-operative Wool-growers' Association.
 Vryburg Co-operative Wool-growers' Association.
 De Aar Co-operative Wool-growers' Association.

Mr. Hannon, the Cape Superintendent of Agricultural Co-operation, in his last report, says that in his tours during the year the subject was constantly discussed, and that there was a universal desire on the part of farmers to improve the "get up" of their clips.

The Trades Commissioner for the Cape in London has been in consultation with the leading members of the London Wool Exchange on the subject of the organised attempts at improvement now being made at the instance of the Government, and has furnished the following statement to his Government:—

"I have made careful inquiries amongst the leading wool-brokers and wool buyers in London as to the question of Cape wools, and I am now

prepared to deal only with the question of the effects of the recent improvements in the getting-up and classification of the wools and also the question of a National Brand. . . .

"The general opinion of the brokers and dealers is that there has been considerable improvement in this direction, and that all such improvements are much appreciated by the buyers, though there is still much room for further improvement, which can only be effected by continuously obtaining the opinions of the actual buyers on the large markets, who are the manufacturers of woollen goods, and to bring such information forcibly before the actual producer.

"After going carefully into the matter I find that the person most interested in the quality of the wool on the markets is the man who uses it for manufacturing purposes. He, of course, only pays for it in proportion to the percentage of good quality wool in every bale. On the other hand, the person who can benefit most by the improvement of his methods of get-up and classification is the person producing the wool. The difference between the prices of wools badly got up and well got up is astonishing. I am much struck by the fact that there is a wide gulf between the consumer and the producer.

"My object, therefore, is to bring about a closer line of communication between these parties for the purposes only of conveying clearly to the one the exact wants of the other, so as to enable the producer to carry out the wants of the consumer. It must be clearly understood here, that I am not now alluding in any way to the financial or economic question of collection and distribution, nor do I wish to interfere in any way with the channels through which Cape wools find their way into the hands of the manufacturers.

NATIONAL BRAND OR TRADE MARK.

"The general opinion of wool brokers is that the Brand will, after it has become known, have a good effect upon the market and be advantageous to the associations adopting it, provided, however, that the greatest care is exercised in the classification of the wool sold under this brand, and that a uniformity of the classification is sustained. It must further be remembered that at all public sales the wools are sold almost entirely on their merits and are open for inspection, and that little notice is therefore taken of brands, though good brands are looked for in succeeding years' sales and keenly bid for, but I am informed that the larger portion of Cape wools is sold by samples by private treaty to the manufacturers, and that in these cases a well-known and respected brand would be bound to find a better market.

"To have the National Brand of the Co-operative Associations protected it will be necessary to have same registered as a Registered Trade Mark in Great Britain, as well as in the Cape Colony.

"The question of Trade Marks is not an easy one to decide. Messrs. Findlay, Durham & Brodie, of 110, Cannon Street, E.C., write me as follows:—

"If you had for some time past been using a particular Trade Mark in this country, and found it being used by others you would have a certain right of user which would enable you to prosecute with some chance of success. But the simplest thing to do would be to register in this country. If the mark now being used in the Cape Colony is an infringement of some mark already in use here, it would be a simple matter to make some addition or alteration to it and register afresh in both countries."

"They further state that during the last season there has been a very considerable improvement in the get-up of certain Cape clips of wool, and there is no doubt that this improvement has had a favourable effect on prices.

"Messrs. Helmuth, Schwarz & Co., wool brokers, of 3 and 4, Moorgate Street, E.C., write to the same effect. They say:—

"There is no doubt that a great improvement has been effected in the getting up and classifying of the wools under the control of the Associations, and we trust that this improvement will make further progress."

"Messrs. Henry P. Hughes & Sons, wool brokers, of 10, Basinghall Street, E.C., say:—

"It is high time that steps were taken towards the improvement (especially in the get-up) of Cape clips of wool, and it is very pleasant to be able to state that already in many cases, better prices have resulted. Many clips, however, still show a lamentable want of care, and so sell far cheaper than they would do if properly got up. The proposed introduction, therefore, of a National Brand, "Good Hope" in a crescent, is clearly a step in the right direction. If care is taken to grant it to lots which really are properly classed and skirted, a long-felt want will be met and much good will result. If, on the other hand, the privilege which it is meant (and ought) to ensure is too readily granted; in other words, if any laxity is shown in allowing this brand to be used it will speedily become a meaningless and worthless mark. We hope you will make this very plain, for it is a point on which buyers will undoubtedly have a good deal to say, and it is a matter of vital importance to the growers of the wool."

"Messrs. Thomas & Cook, wool brokers, of 73, Basinghall Street, E.C., say:—

"We are very pleased to note that an effort has been made to more carefully class and skirt wool clips from the Colony. We are very strongly of opinion that as a whole this will be very greatly to the advantage of the growers, if the classing does not necessitate making too many of the very small lots of each quality. A large grower might pack his hoggets, ewes,

and wethers separately, and even select, and pack the best of these for lengths, etc., separately from the others, and also keep his pieces, bellies and locks, but packing these together as skirts. Speaking from 50 years' experience of selling wool in the London market, we are convinced that small lots do not as a rule sell as well as large ones, and this is why we suggest that in small clips, the classing would not be carried to the extent of making a number of very small lots.'

"Messrs. Willans & Overburg, wool brokers, of 7, 9, and 11, Moor-gate Street, E.C., say:—

"There can be little doubt that the efforts of the Association referred to in the letter of the Superintendent of Agricultural Co-operation, Cape-town, have resulted in a general improvement in the classing and get-up of the wool from South Africa. No doubt the introduction of a National Brand which in time would be recognised as a guarantee of regularity in classing and careful skirting, would be of considerable help to the trade and assist in improving the get-up of the wool, but it appears to us to be a difficult matter to prevent unscrupulous persons from using a similar brand and thus benefiting themselves at the cost of those who are entitled to the advantage. Uniformity in length of staple, regularity in condition and colour and careful skirting are the most important points in connection with wool in the grease. We shall be happy to provide you with any further information you may require, but the Superintendent, Mr. P. J. Hannon, appears to have a thorough knowledge of what is required—the difficulty, of course, being to persuade the owners that the better the wool is got up, the more profitable the returns.'

"Messrs. Chas. Balme & Co., brokers, 61, Basinghall Street, E.C., report (at the conclusion of the previous wool sales):—

"A few lots of new clip greasy wools from the Western Province, which had been specially classed and skirted in accordance with advice given by the Government Expert were offered during the series. These clips, which were in exceptionally light condition, attracted unusually keen competition, and sold at prices ranging from 1s. to 1s. 1½d. per lb., figures which fully demonstrate the advantages accruing to growers from efficiently classing and skirting their wools. It is to be hoped that flock owners in other parts of the South African Colonies, who have not hitherto troubled themselves to class and skirt, will also be induced by the Government officials to take greater pains in preparing their wools for market, and that if nothing else is attempted, they will at least remove dung-lumps and heavy skirts from the fleeces before they are packed.'"

STATISTICS.

Mr. Hannon publishes in his report the following statistics of supply, consumption and prices of wool, which should prove interesting to pastoral farmers in this Colony:—

	Highest Point.		Lowest Point.		Mean Point.	1906.
	Year.	d.	Year.	d.	d.	d.
Australian, good average, greasy ...	1899	15½	1895	7½	11½	13½
„ Sydney, greasy ...	„	13	„	6	9½	11
„ Adelaide, greasy ...	„	11	„	5	8	9½
„ N.Z., greasy ...	„	15	„	7½	11½	13½
„ Crossbred, greasy...	„	16½	1901	9	12½	16½
Cape, Eastern, fleece ...	„	14	1895	6½	10½	10½
Argentine, greasy (36 per cent. yield) ...	„	9½	„	4½	7	8½
Mohair, Turkish ...	1895	32	1892	12	22	16½

The total annual value of Colonial supplies of wools, in 1895, 1899, 1903 and 1906, has been:—

Year.	Australian Bales	Cape Bales.	Average Value per Bale.	Total Value.
			£	£
1895	2,001,000	269,000	11	24,970,000
1899	1,641,000	267,000	14½	27,666,000
1903	1,451,000	234,000	13½	22,747,000
1906	1,833,000	238,000	17	35,207,000

It will be seen that the value per bale is the highest on record for last year, and the total value is also the record figure in the annals of the world's wool markets.

Dealing specially with Cape wools, the imports into Great Britain direct in 1906 amounted to 191,536 bales, with 37,774 shipped to the Continent, against 190,581 and 28,706 in 1905 respectively.

The disposal of Cape wools shipped to England stood thus from the 21st November, 1905, to the 19th November, 1906:—

			Bales.	Bales.
Into England, for sales	...	...		195,960
For London sales	...	...	36,000	
Forwarded to Interior	...	...	34,500	
.. Continent	...	...	125,400	
, America	...	...	100	
Into Continent direct	...	...		42,463
,, America	..	..		...
Total	...	...		<u>238,423</u>

This output was divided thus:—

Western Province	...	...	20,336
Eastern Province	...	...	174,781
Natal and Interior	...	...	43,306

Prices during 1906:—

	Jan.	Mar.	May	July	Sept.	Dec.
	d	d	d	d	d	d
Fleece, superior Western	...	14	14½	14½	14½	14½
,, average Eastern	...	10½	10½	10	10	10½
Grease, Cape	...	10½	11½	12	11	11

Imports of mohair into England:—

		1906	1905	1904
		lbs.	lbs.	lbs.
Turkey, etc.	...	10,500,000	12,500,000	10,800,000
Cape	...	14,600,000	12,500,000	14,000,000

The Consul-General for Portugal at Johannesburg has intimated to the Transvaal Government that land can no longer be granted to foreign settlers on the Huilla Plateau in the Province of Angola, Portuguese West Africa, as all vacant property there is now reserved for Portuguese subjects.

The Government of Western Australia has decided to offer the sum of £100 for an efficient stone and stump gathering machine; and a public trial of the competing machines is to take place in February, 1908. The winning machine will be required to remove or gather into convenient rows all stones and stumps of not less than 4 inches across their longest axis and not exceeding 56 lbs. in weight.

The Land Board.

MONTHLY MEETING.

ON the 25th and 26th September the usual monthly meeting was held in Maritzburg. Mr. Leonard Acutt, one of the original members, was elected Chairman for the ensuing year. Owing to illness, Mr. E. T. Mullens was prevented from being present.

In view of the large number of applications which have been received for land, it was decided at the previous meeting of the Board that further applications for land, other than at Winterton, Winkel Spruit, on the Oribi Flats, in the vicinity of the Umtamvuna, and in Zululand, should not, for the time being, be entertained; consequently only eight applicants appeared before the Board in support of their applications. A number of other applicants who had previously appeared before the Board were finally passed on the production of satisfactory evidence in respect to their capital and stock.

An interesting report was laid before the Board by the Superintendent of Settlements, from which it appeared that upwards of 600 acres of lucerne are under cultivation at the Weenen Irrigation Settlement, together with some 350 acres of forage. A large number of vines and fruit trees have also been planted, in addition to crops of wheat, barley, peas, onions, and mealies. The report shows that the estimated value of the standing crops amounts to over £9,000. There is every reason to believe that there is a great future for lucerne, which grows extremely well in the Settlement.

On Thursday night, 26th September, the Board left Maritzburg and journeyed by rail to Kwambonambi, which is situated in the Lower Umfolosi Division of Zululand, and which was reached at sundown on the following day. At Empangeni Station the Board was met by Mr. A. R. Turnbull, the local Magistrate, who introduced Mr. G. W. Higgs, who had been engaged to act as guide during the tour.

On Saturday, the 28th, the Board left Kwambonambi at 6 a.m., and travelled by mule wagon through the lands lying to the west of the railway as far as the Isitesa Lake. From that point it proceeded some five miles on foot to the north side of the Umfolosi River, inspecting the lands *en route*. It did not return to camp until five in the evening. At 6.30 the following morning the Board commenced its inspection of the lands lying north of the Mangu Bush and between the railway and Reserve No. IV.

On Monday, the 30th, the Board joined the train from Somkele and

detrained at Empangeni, from which station it set out for the Umzingazi Lake for the purpose of inspecting the lands overlooking the lake. A halt for lunch was made on the borders of the lake lying within Reserve No. VI., but, as it was found impossible to reach the north end of the lake, a wide detour had to be made. On reaching a ravine which was impassable to vehicular transport, the Board was compelled to leave the mule wagon and travel some distance on foot. The Board eventually returned to Empangeni at 7.30 in the evening.

Owing to there being only a tri-weekly railway service between Empangeni and Ginginhlovu, the Board had to remain over Tuesday, which was devoted to inspecting the sugar cane on the farms of Mr. C. B. Addison and others in the immediate vicinity of the station, and, later in the day, the block of land between the Magistracy and Reserve No. V. The Board has, therefore, made an inspection of practically all the land available for settlement between the Umhlutuzi and the Umfolosi Rivers.

We understand the Board has reported that there is a block of from 15,000 to 20,000 acres of land south of the Umfolosi, lying east and west of the railway, which is eminently suited to the cultivation of sugar cane. There is, in addition, on the west side, high-lying ground which would make excellent homestead sites. Orchards could be advantageously laid off on the northern (across the river), western, and southern boundaries of the sugar land. The magnificent fresh water lake of Isitesa, and the Umfolosi River may possibly prove an attraction in the future.

The remainder of the lands lying south and east of the line, as far south as Empangeni, is suitable for grazing purposes. Cattle, native sheep, and goats are doing well on the lands. Persian sheep might also thrive well.

On the Umhlutuzi lands which were recently thrown open for allotment the Board found sugar cane of only one year's growth looking as well as any on the finest land in Natal, and the Coast members of the Board agreed that they had never seen better canes for their age. The Board considers that the planters in this district have every chance of success.

Prior to the departure of the train on Wednesday morning, the Board visited the Government Forest Station at Empangeni.

The next meeting of the Board will be held in Maritzburg on Tuesday and Wednesday, the 22nd and 23rd inst., and on Thursday, the 24th, the Board, accompanied by the Minister of Agriculture, will start on an annual tour of inspection of the Winterton and Weenen Settlements. After visiting Winterton, the Board will inspect the farm "Varkensfontein," which is situated near Colenso, and which has, up to the present, been reserved in connection with a large irrigation scheme which it was at one time proposed to undertake.

Fruit and Vegetable Drying and Evaporating.

By E. R. SAWER, Director, Experiment Stations.

THE organised export of fresh fruit, though offering a long sought remedy for the congestion of supplies at local centres of consumption, leaves our outlying districts still at a loss in view of the difficulties of transporting such perishable produce to the railway. The only means of utilising any surplus in such districts has in the past been that of preserving with the aid of syrups, etc. The process of bottling, however, entails much labour and the expense attendant on the many accessories required, such as sugar, cans, covers, etc. The process of evaporating consists, briefly in preserving fruit, and vegetables by the artificial evaporation of their moisture, whereby their food value is not only not impaired but increased, and the products, perishable in their natural form, rendered capable of being stored in a concentrated form for future use or sale. Drying in the sun, while a cheap method, is in this country attended with considerable risk of rain at the time when the work would have to be carried out, and it is not so effectual as evaporating in a properly constructed machine, for in the former case the aroma and bouquet of the product is not only evaporated, but also dissipated. The use of trays placed one above another in the evaporator, while not sensibly retarding the drying process, causes the partially dried product in the higher trays to absorb the flavour and bouquet given off from the less dried produce in the lower trays.

METHOD OF EVAPORATING.

The method of setting fruit or vegetables to dry is really a simple one, and can be readily acquired. A fire is lighted in the oven, cold air passes in at the bottom opening, is heated on its passage, and is distributed by a deflector spreader, causing thus a free circulation of heated air through the trays placed in the upper part of the apparatus. A thermometer marks the temperature reached, and this latter can be modified by the admission of more, or the greater exclusion of, fresh air through the valve on the spreader. In case of the heat being too great, it may also be lessened by opening the fire-box. Ordinary coal can be burnt, so also can wood, coke, etc. The sides being double-cased, and the space between being filled with sand, ashes, or some slowly conducting material, very little heat is lost, as can be readily seen by placing the hand anywhere on the outside of the apparatus. The fruit or vegetables, after being cut, sliced, or otherwise prepared, according to their several requirements, are placed

on the wire netting of the wooden trays in succession. The fluting of the wire netting allows of a larger drying surface being exposed, and more material can be dried, inasmuch as one piece does not, as a rule, come in contact with its neighbours, and so dries better and more rapidly. There are two ways of filling the upper part of the apparatus, the one being by putting each tray in successively from *below*, until the one first put in gradually rises to the top; the other way is by putting in each tray, as filled, at the *top* of the apparatus, and letting it work its way down until it reaches the bottom. Which way is to be adopted depends upon the kind of fruit or vegetable. Those kinds which, like apples, pears, and vegetables generally, are of a more or less hard nature are placed in at the bottom, *i.e.*, where the heat is greatest, the trays ascending successively until the top, or coolest part, is reached, while such materials as stone-fruit, berries, etc., which would, if at once exposed to a strong heat, burst the skin and let the juice escape, are placed in from the top, and the trays gradually work their way down. In this way the skin is not cracked, but slowly dries up and hardens, retaining the juice within the fruit.

TREATMENT OF FRUIT.

Apples.—The method of preparing apples to be evaporated is as follows: They are first pared, cored, and sliced by a very simple and ingenious machine which will either pare, core and slice the apples, or, by removing a knife, will only pare them as for whole apples or the so-called Normandy Pippins. After the apples have been pared, cored, and sliced they are placed in a tub of perfectly clean water, containing a small quantity of salt, which prevents oxidation and discolouration. They are then cut once vertically, and all bruises, specks, and parings trimmed away to produce the well-known apple rings of commerce. They are then placed thinly on a tray and entered at the lower end of the *upper* flue. Sometimes a little sulphur may be sprinkled on the furnace with great advantage for the purpose of bleaching the rings. The first tray remains in the position just mentioned until the second tray is ready—which will be in four or five minutes—to be placed under the first tray; the third tray is then filled in the usual manner and placed under the second tray, and when the fourth tray is ready the first three trays are pushed forward in the flue, and the fourth tray takes the place of No. 1, and so on until the top flue is full. On the arrival of the first tray at the upper end of the flue the contents are examined, and those that are sufficiently dried are removed, and the remainder turned over and returned down the lower and cooler flue. In many cases one tray will hold the whole of the contents (which are nearly dried) of two or three trays, the empty ones being taken away to be again filled with fresh fruit. The degree of heat used for drying apples is from 175 degs. to 240 degs. Fahrenheit; and the time occupied varies from two to four hours, according to the variety of the

apple, but from two to two and a half hours is the usual time. Whole apples require a much longer time, eight to ten hours, according to size and variety.

Plums are dried in the same manner except that they are placed in the evaporator at once. They should be graded according to size and be uniformly ripe. During the process of evaporation plums ought to be removed from the evaporator once or twice for the purpose of cooling them and toughening the skin and so prevent bursting, which they are liable to do, because the skin does not allow the moisture in the fruit to freely escape when first placed in the machine. As soon as the plums commence to shrivel, all danger of bursting is past, and they may then remain in the evaporator until dry. The time required for plums is from six to ten hours, and the temperature requisite 240 degs. to 300 degs. Fahrenheit. Plums may be steamed for a few minutes and then split in half, thus entirely dispensing with the cooling process and considerably reducing the length of time required in drying. 100 lb. of fresh plums will give about 30 lb. of dried.

Apricots are simply cut in two, the stones being taken out, and the fruit then dried just like apples, at from 240 degs. to 250 degs. Fahrenheit. They take from two to three hours to dry. From 100 lb. of fresh fruit, 10 to 12 lb. of dried will result.

Peaches should first be peeled and then treated similarly to apricots. The temperature required is 200 degs. to 212 degs. Fahrenheit, and two to three hours to dry.

Pears for drying purposes ought not to be quite ripe. They are peeled, and either dried whole, or, more generally, are divided, and the seed-vessels cut out, the stems being left on. They then require steaming for eight or ten minutes, and are filled in from the bottom upwards. The temperature used is 212 degs. to 240 degs. Fahrenheit, and the pears will take five to seven hours to dry if divided, or seven to nine hours if whole. From 100 lb. of fresh pears 12 to 16 lbs. of dried ones will be obtained. When preparing the pears before drying, the flavour will be improved if a little sugar be added to the water in which they are cooked, and to this may be put the juice of the removed seed-vessels and peelings.

Strawberries.—Such fruits as strawberries, bilberries, etc., can quite easily be dried, and they retain their flavour satisfactorily. They are filled in from above, just as with cherries. They require drying for four or five hours at not too high a temperature, say, not higher than 140 degs. Fahrenheit.

Figs ought to be placed in the evaporator at once and treated the same as plums but without the cooling process.

Currents of all kinds only require "grading" before being dried. Time, two or three hours. Temperature, 180 degs. to 200 degs. Fahrenheit.

TREATMENT OF VEGETABLES.

All vegetables (herbs alone excepted) require, in addition to the peeling, slicing, or cutting up, to be steamed or cooked for five to seven minutes before they are dried. This is necessary in order to keep their colour and to prevent their becoming hard. When dried on a small scale the cooking in boiling water is generally sufficient. In factories, and where dried on a large scale, regular steaming apparatus is used. Like apples, vegetables are always filled in from below upwards.

French Beans.—These are cut into strips by a special machine, and cooked for a few minutes. A little soda added to the water helps to preserve their bright green colour. Time required for drying, three-quarters to one hour. Temperature 150 degs. to 160 degs. Fahrenheit. 100 lb. of fresh beans give 10 to 12 lb. of dry.

Peas require simply shelling and a few minutes' cooking. They should not be quite ripe, and are laid thinly on the trays, and will take one to one and a half hours to dry. Temperature, 212 degs. to 220 degs. Fahrenheit. 100 lb. of green pods will yield about 10 to 12 lb. of dried peas.

Cabbages.—With cabbages the mid-rib of the leaf is cut out, and also the thicker ribs when they occur; the cabbages are then cut up, cooked, spread thinly on the trays, and dried as usual for about three hours. From 100 lb. of green stuff about 7 lb. of dry cabbage can be got. Red cabbage must be cooked only for a very short time, or it will lose its colour.

Cauliflowers.—Cauliflowers are broken up into single pieces or lumps, cooked for about five minutes, and dried like cabbage. They often get a brown colour in drying, but, on cooking again, the white colour reappears. From three to four hours is required for the drying. From 100 lb. of the fresh cauliflower heads some 4 to 5 lb. of dried produce will be obtained.

Carrots.—Carrots are cleaned, scraped, and cut into slices of about one eighth inch thickness. After cooking they are spread lightly on the trays and dried for three hours to three-and-a-half hours. 100 lb. of the fresh vegetable yield about 8 lb. of dried carrots.

Celery.—Celery is cleaned, peeled, and cut into strips one-eighth inch thick. It must be cooked until half soft, and then laid on trays just like apple "rings." The drying takes three to four hours, and from 100 lb. of fresh celery about 4½ lb. of dry celery can be got.

Onions.—With onions the shell is removed, and they are cut into slices about a quarter inch thick. They take three to four hours to dry. From 100 lb. of fresh onions 10 to 12 lb. of dried onions may be obtained.

Potatoes.—After washing and peeling, potatoes can be either cut up into thin slices or into strips. When putting them in boiling water before drying it is well to add some salt to the water. They will dry in

two or three hours at a temperature of 200 degs. to 212 degs. Fahrenheit (90 degs. to 100 degs. C.).

Herbs, etc.—Various herbs, such as parsley, mint, rosemary, lavender, woodruff, etc., can be similarly dried. They must not be put in boiling water before drying. With some, such as parsley, mint, etc., it is a good plan to grind them to a powder after drying.

Mushrooms will dry perfectly well, but *Asparagus* is of too watery a nature to deal with successfully by drying.

SELECTION OF FRUIT.

When fruit is intended for sale, care must be taken in the selection, alike as regards uniformity of kind, size, ripeness, soundness, and quality. This can never be secured if a number of different sorts of apples for instance are dried together, or fallen fruit is used with sound fruit.

PACKING AND STORING.

After fruit or vegetables have been dried they ought to be left exposed to the air for six or seven days in a dry, well-ventilated room. If put away in boxes at once after drying, they are apt to become mouldy. They need watching from time to time while in the store room, and any bad fruit, etc., must be removed, or that which turns mouldy must be further dried in the oven. After this, the produce may be packed in wooden boxes, bottles, etc., and will keep perfectly well, though not excluded from the air.

PREPARATION OF THE DRIED MATERIAL FOR USE.

When required for use, the dried fruit or vegetables merely require soaking in warm water for four to six hours, according to the nature of the material. After the soaking, they are cooked just as one would cook fresh fruit or vegetables. Apples should be cooked in the same water as that in which they are soaked. Vegetables, when required for soups, need no preliminary soaking, but are put in the broth direct, long enough beforehand to ensure their becoming tender.

See to your plough mouldboards this spring, and don't put them away after ploughing without giving them a coating of heavy grease first, otherwise you will only have yourself to blame for the rust that appears on them. In fact, all your implements should be well oiled and looked after: because machinery is made for farm use it does not follow that it is made for the use it often receives on the farm.

European Prices of Sugar.

THE following statement was prepared by the British Board of Trade in response to an Order of the House of Commons, dated 15th July, calling for a return "showing, with regard to London, Paris, and Berlin, the price of sugar and the duty levied thereon at the first day of March, 1903, 1904, 1905, 1906, and 1907 (in continuation of Parliamentary Paper No. 132, of Session 1906)."

With regard to this return, it is explained that the prices given are those of the kind of sugar most largely consumed by the working classes in each capital. It is not to be understood that the prices refer to a uniform grade of sugar in the three cities.

RETAIL PRICE OF SUGAR AT MARCH 1ST.					
	1903	1904	1905	1906	1907
LONDON :	d. per lb.	d. per lb.	d. per lb.	d. per lb.	d. per lb.
Retail Price ...	1¾	1¾	2¾	2	2
Customs Duty ...	0.45	0.45	0.45	0.45	0.45
Excise Duty ...	...	...	...	...	...
PARIS :					
Retail Price ...	4¼	3	3½	3	3
Customs Duty† ...	3.23*	1.44*†	1.44*	1.44*	1.44*
Excise Duty ...	2.79*	1.18*†	1.18*	1.18*	1.18*
BERLIN :					
Retail Price ...	3¼	2¾	2¾	2¼	2¼
Customs Duty† ...	2.18	1.02†	1.02	1.02	1.02
Excise Duty ...	1.09	0.76†	0.76	0.76	0.79

*Including also the "*taxe de raffinage*," levied equally on imported sugar and on sugar of home production.

†In force from 1st September, 1903.

‡In France and Germany imported sugar is subject to Excise Duty in addition to Import Duty proper. The "Customs Duty" stated above for these countries includes the total amount of duty payable on importation—i.e., it includes both Import and Excise Duty.

Glanders Regulations in Great Britain.

AN Order issued by the British Board of Agriculture on the 23rd August last contained regulations for dealing with glanders or farcy in horses, asses, and mules.

Notification of the presence of the disease having been made with all practicable speed to an Inspector of the Local Authority, through a constable of the police force, the Local Authority is empowered to order the slaughter of all diseased animals and the quarantine of all suspected or in-contact animals, during which quarantine they may be subjected, with the consent of the owner, to the mallein test by a Veterinary Inspector of the Local Authority. Should the test result in definite evidence of the disease in an animal, the animal must be slaughtered at once; whilst in a case where the indications obtained as a result of the test do not, in the opinion of the Veterinary Inspector, amount to definite evidence of the disease, the test is to be applied a second time, before twelve days elapse. If the second application does not result in definite evidence of the disease, the quarantine requirements can be withdrawn.

In the case of every animal slaughtered, in which at the time of slaughter the clinical symptoms are not definite evidence of the disease, a *post-mortem* examination, by a Veterinary Inspector, is required to be held. If this examination does not show that the animal was affected with glanders, the Local Authority is required to pay to the owner, out of the local rates, the full value of the animal immediately before it received the mallein test, as compensation, but the sum paid may not exceed £50 for a horse, or £12 for an ass or mule. Should, moreover, the veterinary examination show that the animal was affected with glanders, the Local Authority is required to pay one-half of the value of the animal, the maximum being £25 for a horse and £6 for an ass or mule.

Power is given to Local Authorities to make such regulations as they may think fit for any of the following purposes: (a) for providing for the cleansing and disinfection of places used by, and of utensils, mangers, feeding-troughs, pens, hurdles, or other things used for or about any diseased animal; (b) for providing for the cleansing and disinfection of vans or carts or other vehicles used for carrying any diseased horse, ass, or mule on land otherwise than on a railway; (c) for prescribing the mode in which such cleansing and such disinfection are to be effected; (d) for providing that such places, utensils, etc., are to be cleansed and disinfected at the expense of the Local Authority, or of the owner, lessee, or occupier thereof; (e) for regulating the taking out of any stable, building, field, or other place of any fodder, litter, or other thing that has been in contact

with or used for or about any diseased horse, ass or mule; and (f) for requiring the removal by the owner from contact with horses, asses, or mules, of litter used for or about any diseased animal. If any person fails to cleanse and disinfect in accordance with such regulations, the Local Authority may have the work done and recover the expenses thereby incurred from him.

It is made unlawful for any person to allow a diseased animal to appear in any public place or thoroughfare or on a common or unenclosed land; and where an animal is found under such conditions, the Local Authority is empowered to order its destruction, any expenses incurred in connection therewith being recoverable from the owner of the animal.

The carcasses of animals slaughtered must be buried in quicklime, or burnt, or destroyed by chemical agents, or be disposed of in any other manner as the Board of Agriculture may permit by license.

Under this Order no horse, ass, or mule, brought to Great Britain from any other country except Ireland, the Channel Islands, or the Isle of Man, can be landed unless it is accompanied by a certificate of a veterinary surgeon to the effect that he examined the animal immediately before it was embarked, or whilst it was on board the vessel, as the case may be, and that he found that the animal did not show symptoms of disease. The Order further enacts that if any horse, ass, or mule is landed in contravention of the Order, the owner thereof, and the owner and the lessee and occupier of the place of landing where such animal is landed, and also the owner and the charterer and the master of the vessel from which the same is landed, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894; and renders himself liable to a penalty of £20.

Under the "shares" or *metayage* system of farming in vogue in certain parts of France—principally in the department of Allier—the cultivator tills the soil for the land-owner on condition of receiving a share, generally a half, of its produce, the owner furnishing the whole or part of the stock, implements, etc.

It is estimated that growing pigs placed on rape at about twenty-five to the acre will for two or three months require only half as much grain as sty-fed animals. Pigs running out like this also tend to become stouter and healthier than when in confinement. They will live and grow on the rape without a supplement of grain, but a small addition of the latter has been found profitable. Dry sows, however, will do well on the rape alone.

Irrigation and Drainage.

WHERE natural drainage is not afforded, it must sooner or later be supplied by man. The amount of water which is actually taken up by plants is perhaps but a small part of what is usually applied to the land by irrigation. The excess water, with the exception of what is evaporated, soaks away into the soil and seeks the lower levels; and it is from the accumulation of this water in the low places that the necessity for drainage comes.

The experience in the Yakima Valley of the State of Washington, U.S.A., has, according to Mr. S. O. Jayne, of the U.S. Office of Experiment Stations, who has prepared a lengthy report on irrigation in the Yakima Valley, been such as to confirm the rule that may be laid down with regard to practically every irrigated district in the Western States, or wherever irrigation is practised, that drainage is always a necessary adjunct, and must go hand in hand with it. Some sections, he says, are so favoured by nature as to have this requirement supplied, but the majority of the irrigated districts of the West are not so fortunate in this respect, and the Yakima Valley is one of these. Before irrigation was begun, the subsoil on the higher lands was, we are told, practically without moisture, and its capacity for absorption was therefore large, so that the excess water for a few years was taken care of, and the necessity for drainage in many places was not realised until much damage had resulted. There are thousands of acres of what has been valuable and productive land, now practically worthless swamp or alkali waste, because the need of drainage was not soon enough realised and the means for it provided.

Six drainage districts have been organised in Yakima County, and thousands of dollars have been spent for the construction of ditches where fifteen years ago the idea of drainage was not dreamed of, and where if one had suggested such for future need he would have been considered mentally unbalanced. This work was delayed too long, and the delay has so increased the cost of construction that, where thousands have now been spent, hundreds would have been more than ample if the work had been undertaken before the damage had gone so far. These lands requiring drainage are not confined to the Yakima county, but are found throughout the valley wherever irrigation has been practised for any length of time.

The low lands, especially those under the lower or older canals, are the first to suffer, and it is not many years from the time high line ditches are built and in operation until the injury begins. The injury, moreover, is not always to the low-lying lands alone: in some places the need of drainage is plainly evident, even on hillsides with comparatively

steep slopes. This is due to the outcropping of hardpan or impervious strata along which the water gradually works from the higher levels, and, coming out on the hillsides and evaporating, leaves the fatal alkali, which destroys the crops and ruins the land.

In the Yakima district a large amount of drainage, Mr. Jayne advises, should be done; and there are also in the Ellensburg district considerable areas now worthless for anything more than pasture, all due to the same cause—excessive irrigation. At Kennewick, where the summer of 1906 was the fourth season that water had been flowing in the canal, there is increased evidence of the need of drainage, and already several hundred acres have been transformed from sandy desert to duck ponds. The question of drainage is one of growing importance with every year that irrigation continues. Experience has shown that delays are fatal when the struggle is against the combination of water and alkali, and for this reason all possible precautions should be taken in the future to forestall such injuries as have already been experienced, due to neglect in providing drainage in proper time.

Points of a Berkshire Pig.

THE following schedule, recently revised by a special committee of the British Berkshire Society, was adopted by the council at their Smithfield meeting in December last:—

Colour.—Black, with white on face, feet and tip of tail.

Skin.—Fine and free from wrinkles.

Hair.—Long, fine and plentiful.

Head.—Moderately short, face dished, snout broad, and wide between the eyes and ears.

Ears.—Fairly large, carried erect or slightly inclined forward and fringed with fine hair.

Neck.—Medium length, evenly set on the shoulders; jowl full and not heavy.

Shoulders.—Fine and well sloped backwards, free from coarseness.

Back.—Long and straight, ribs well sprung, sides deep.

Hams.—Wide and deep to hocks.

Tail.—Set high and fairly large.

Flank.—Deep and well let down, making straight underline.

Legs and Feet.—Short, straight and strong, set wide apart, and hoofs nearly erect.

Objections are a perfectly black face, foot, or tail. A “rose” back. White or sandy spots on the body. A white ear. A very coarse mane, and inbent knees.

The Destruction of Locusts.

S.A. LOCUST BUREAU'S SUGGESTIONS.

THE Committee of Control of the South African Central Locust Bureau recently submitted a report to the various South African Governments containing some recommendations in connection with the destruction of locusts with arsenical solutions, based upon the results of a successful use of it over such widely different topographical conditions as those presented by the abrupt and hilly nature of Natal and the plains of the Transvaal and Orange River Colony.

In preparing the poison, white arsenic, soda, and treacle as a sweetening agent were originally used by the planters of Natal. In the course of the Government's operations it was found impracticable to transport treacle advantageously over long distances, and treacle sugar and mill sweepings were adopted. Subsequently, on the suggestion of Mr. C. P. Lounsbury, the Cape Entomologist, a trial was made with arsenite of soda in Natal, and this proved of so great an advantage, economically, over the arsenic and soda solution that it is now adopted by all the Governments.

In view of the advisability of a more general adoption of poisoning than even now exists, the Committee has made the following suggestions in order that recognised formulae for the preparation and use of such poison may be agreed upon.

The formulae for arsenical solution for the destruction of wingless locusts are given—the white arsenic solution and the arsenite of soda or sodium arsenite solution.

WHITE ARSENIC SOLUTION.

Formula.

White Arsenic (Arsenious Oxide)	1 pound.
Soda (Caustic or Washing)	8 ounces.
Sugar or Treacle	2—4 pounds.
Water	17 gallons.

Boil the arsenic and soda together with 2—3 gallons of water in a 4-gallon tin or pot until the arsenic is quite dissolved. While this is being done dissolve the sugar in another vessel. Mix together with the balance of the water and the solution is ready.

ARSENITE OF SODA OR SODIUM ARSENITE SOLUTION.

Formula.

Arsenite of Soda	1 pound.
Sugar or Treacle	2—4 pounds.
Water	16 gallons.

Mix the arsenite of soda and sugar (or treacle) in sufficient cold water to thoroughly dissolve them; when this is accomplished add the balance of water and the solution is ready for use. The arsenite of soda will dissolve more readily in hot water than cold, but it is only necessary to do this when the saving of time is the main object in view. In preparing large quantities of solution it is best to place the arsenite of soda in water and allow it to remain there overnight, about one gallon of water should be allowed for each pound weight of the arsenite. By suspending the poison tied in a sack, in the water, the dissolving thereof is facilitated.

USE OF THE SOLUTION.

(a) Whichever solution is adopted should be sprayed on the grass, bushes, etc., which the locusts are eating, or just about to eat. When they are small it may be sprayed among them or in a circle around them; but, when large and on the move, a strip of grass along their front should be sprayed.

(b) The solution is best applied with a spray pump, and for the purpose the "Deming's Success" Bucket Pump, fitted with a "Bordeaux" nozzle, has been found the most suitable. These spray pumps require a certain amount of care in handling, and it is well to practise with water before using the solution. The nozzle must be adjusted to throw a fine mist to fall lightly on the grass without drenching it. The nozzle of the pump should not be turned off whilst pumping is going on or whilst there is pressure from the air-chamber. If this is done, not only is the hose loosened but it may very often burst or be otherwise damaged by the great pressure of the liquid contained in it.

(c) A good time to spray is when the locusts are camping for the night or otherwise in the very early morning before they spread out and become active in the heat of the sun.

VARIOUS STRENGTHS OF SOLUTION.

(a) In preparing the solution an ordinary paraffin tin may be used as a 4-gallon measure for the water, the ordinary 4 lb. golden syrup tin makes a convenient measure for treacle, and a bully-beef tin or a large cup will hold 1 lb. of arsenite of soda. Large quantities, however, should be weighed where the weight contained in the package is unknown.

(b) Whilst the locusts are young, *i.e.*, in the first two weeks of their growth, the solution should be prepared as follows:—

Arsenite of Soda—1 lb. (1 beef tin or large cupful).

Sugar—2 to 4 lbs. (2 or 4 beef tins or 2 or 4 large cups full).

Or Treacle—2 or 4 lbs. (1 syrup tin full).

Water—16 gallons (4 paraffin tins full).

(c) When the locusts are half-grown, *i.e.*, from 2 to 5 weeks old, the solution should be strengthened to:—

Arsenite of Soda—1 lb.

Sugar—2 to 4 lbs.

Or Treacle—2 to 4 lbs.

Water—12 gallons (3 paraffin tins full).

(d) For large hoppers with wing-pads well defined, from 5 to 8 weeks old, use:—

Arsenite of Soda—1 lb.

Sugar—2 to 4 lbs.

Or Treacle—2 to 4 lbs.

Water—8 gallons (2 paraffin tins full).

(e) A solution stronger than one pound of arsenite of soda to eight gallons of water should on no account be used.

(f) Locusts when poisoned may take up to four days to die off.

(g) Packages containing arsenic or arsenite of soda should be marked "Poison," and kept under lock and key.

(h) Analysis has shown that 36 lbs. of grass, sprayed with the strongest solution recommended will, if eaten, contain sufficient arsenic to kill a young calf; and 72 lbs. an ox. Therefore all animals should be kept away from the sprayed areas until the arsenic has burned the grass and caused it to die, or until a heavy rain has washed it off.

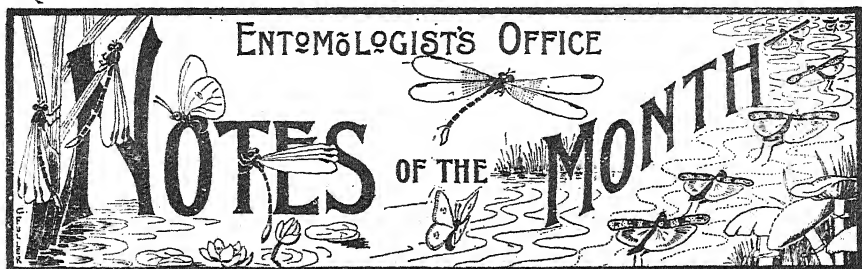
(i) As the solution has a caustic effect and not unusually induces sores upon the bare legs of natives when spraying, they should be provided with trousers or leggings of sacking or otherwise with grease to rub the limbs before commencing the day's work.

(j) Care must, of course, be taken to prevent animals drinking from vessels containing the solution.

(k) If these precautions are carried out no accidents need occur.

Just as we go to press advice has come to hand that Natal mealies are now realising 28s. per quarter on the London market.

Cows giving the greatest quantities of milk exhibit the greatest appetites for salt, remarks the *Quarterly Journal* of the Bengal Department of Agriculture. About three-quarters of an ounce of salt is necessary for every 1,000lbs. of live weight, and six-tenths of an ounce for every twenty pounds of milk yielded. Cows are never, in actual practice, entirely deprived of salt, since every form of food they consume contains a larger or smaller amount of salt, but often not enough to supply the demand of the animal system together with that which finds its way into the milk.



Locusts in September.

THE movements of locust swarms throughout the month of September may be characterised as restless. During the first and second weeks of the month the Greytown and New Hanover districts and districts to the north of Maritzburg were visited by numerous and very large swarms. These, however, seem to have completely disappeared before the middle of the month.

The reports as received are tabulated below. X, represents settled swarms; and O, circling swarm; f—fairly, v—very, l—large, s—swarm.

Date.	Locality.	Direction of Flight, etc.	Date.	Locality.	Direction of Flight, etc.
FIRST WEEK.			FIRST WEEK (Continued).		
September.			September.		
1. Albert Falls (f.l.s.)	S.W.		6. Mid-Illovo		X
Noodsberg (v.l.s.)	N.W.		Ndwedwe (all over district)		X
Wartburg (v.l.s.)	N.-S.		7. Richmond, Rosebank		X
Swainan's Location	X		Howick		N.
Impolweni Mission	X		Mtunzini		O
Krantzkop	S.		Police Station reports for week ending:—		
Moguntia	X		Nqutu, Red Hill, Bluff, Tongaat, Hillcrest, Babanango, Impendhle, Umhlali, Vryheid (Leuwnek), Ndumu, Maputa		nil.
2. Ndwedwe (l.s.)	W.				
3. Krantzkop (3 swarms)	X		SECOND WEEK.		
4. Mid-Illovo	X		8. Greytown, Ematimatolo		N.E.
Eshowe	S.		Paulpietersburg		E.
Albert Falls (l.s.)	N.		Sinkwazi		W.
Eshowe	S.		Glendale		W.
Krantzkop (2 swarms)	X		Mapumulo		X
5. Mid-Illovo, Kleinthal	X		Nkandhla		S.E.
Mtunzini	S.		Noodsberg (v.l.s.)		X
St. Faith's, Ixopo	S.W.				
Eshowe	S.				
Hilton Road	N.				
Mid-Illovo, Stirling	X				

Date.	Locality.	Direction of Flight, etc.	Date.	Locality.	Direction of Flight, etc.
SECOND WEEK (Continued).			FOURTH WEEK.		
September.			September.		
9.	Empangeni	N.E.	22.	Richmond	N.E.
	Dalton	E.		Umquahumbi Valley	X
	Verulam	nil.	25.	Mehlomonyana (l.s.)	X
	Paulpietersburg	S.E.		Eshowe	S.
10.	Greytown (v.l.s.)	O		Ndumu	S.
	Crammond	N.	26.	Umtamvuna (v.l.s.)	S.
	Harburg	O		Verulam (l.s.)	N.E.
	Pivaan's River	N.		Kearsney	W.-E.
11.	New Hanover District	O		Empangeni (2 swarms)	N.E.
	Mabendlhana, Ixopo	O	29.	Tongaat (2 v.l.s. swarms)	W. & E.
12.	Albert Falls (v.l.s.)	S.		Nongoma (v.l.s.)	S.
	Claridge	N.	30.	St. Faith's	X
	Mapumulo	E.	26.	Empangeni	N.W.
	Mtunzini (l.s.)	N.W.		Stanger (v.l.s.)	E.
	Nongoma (v.l.s.)	S.W.		Nongoma	S.
	Umtamvuna (v.l.s.)	W.		Inyoni (supposed to be laying eggs)	N.W.
	Manderston (l.s.)	W.	27.	Stanger (l.s.)	E.
	Ndumu (v.l.s., from across border)	S.		Umhlati (l.s.)	N.
14.	Glendale	S.E.		Ixopo (v.l.s.)	N.
Police Station reports for week ending:				Mseleni, Ingwavuma	S.E.
	Tabankulu (Vryheid), Nqutu,			Darnal	N.E.
	Babanango, Tongaat, Avoca,			Ingwavuma	N.E.
	Scottburg, Umhlali, S.C.		28.	Springvale	X
	Junction, Verulam	nil.		La Merey (biggest swarm for years)	S.W.-E.
THIRD WEEK.				Camperdown	S.
15.	Insuzi	N.W.		Tongaat	N.E.
	Ingwavuma	X		Umquahumbi	S.E.
16.	Springvale, Ixopo	X		Doesburg	S.E.
	Vryheid District (several swarms)	O		Mt. Edgecombe	N.
17.	Harding, Mt. Pleasant	S.W.		Verulam	N.
18.	Cato Ridge	N.		Ottawa	N.
	Stanger (l.s.)	O		Inyoni	O
	Highflats	N.E.		Nongoma (v.l.s.)	E.
	Ismont	O		Inchanga	S.W.
	Harding	W.-E.		Melmoth (v.l.s.)	N.E.
	Stanger (l.s.)	S.E.		Melmoth (l.s.)	S.
19.	Mapumulo	O	Police Station reports for week ending:		
21.	Ndwedwe	O.		Ingwavuma, Nqutu, Baban-	
	Reit Valley (l.s.)	N.W.		ango, Mehlomonyana, Avoca,	
	Mid-Illovo	E.		Leuwnek, Impendhle, Emati-	
Police Station reports for week ending:				matolo	nil.
	Tongaat, Umhlali, Avoca,		30.	Murchison (v.l.s.)	N.W.
	Verulam, Scottburg, Nqutu,			Mid-Illovo	S.W.
	Babanango, Isipofu	nil.		Equeefa (free for past month).	

LOCUST FORECAST FOR NOVEMBER.

From information collected and supplied, it is possible to forecast the appearance of hoppers in the following areas, during next month—for all practical purposes, nearly a month earlier than last season, and about two months earlier than usual.

ZULULAND.

Mtunzini Division	...	...	November	8th—12th
Lower Umfolosi Division	...	...	,,	10th—14th
Ndwandwe Division	...	...	,,	15th—20th
Eshowe Division	...	...	,,	15th—20th

NATAL.

Vryheid	...	...	November	15th—20th
Umvoti Location (Mapumulo)	...	...	,,	15th—20th
Lower Tugela	...	...	,,	11th—20th
Mount Edgecombe	...	...	,,	11th—14th
Verulam	...	...	,,	20th—24th
Umlazi Location	...	...	,,	20th—24th

A SNAKE AND SOME LOCUSTS.

Writing under date of the 18th October, Mr. Berensberg reports:—
“On the road to Verulam I saw a yellow snake feasting on the locusts. I did not interfere, but left it to its occupation. Only the head was visible, and when a locust settled down before it—a quick movement, and the locust was devoured. During the few minutes that I watched the snake it swallowed about half-a-dozen.”

THE EGG-LAYING OF THE REDWING LOCUST.

One is very often asked how soon locusts lay after pairing, and, for practical purposes, it may be taken for granted that where the insects are seen pairing about there they lay, within a few days.

Egg-laying is not so commonly observed as one might imagine. This is due to the fact that as often as not the act has taken place and is completed by the time one is about in the morning. This is, I think, the reason why everybody does not see the locusts laying their eggs. Several examinations of locusts, taken whilst copulating, have been made this season (October), and in all cases the eggs are fully developed so that they may be deposited directly they are impregnated. Further information as to what becomes of the males and females after laying, may be gathered this year by those who are sufficiently interested in the matter.

LOCUST DESTRUCTION.

COMPULSORY LEGISLATION.

Speaking, at the request of the President, to the resolution urging the necessity of compulsory legislation for the destruction of locusts, before the Annual Meeting of the South African Agricultural Union held recently in Pretoria, the Natal Entomologist remarked *inter alia*:—

“My friend, the Reverend Mr. Scott, has already told you that in Natal we have a Law providing for the compulsory destruction of locusts. On three separate occasions we have had to amend that legislation, and the present Act now in force is not perfect. If the other Colonies are going in for compulsory legislation it is not so much the Natives that would be affected thereby as the Europeans. The people themselves must take this matter up. The principle adopted in Natal is this: The Government undertakes the destruction of locusts in Native locations, and calls upon the farmers to destroy the locusts on their lands.

“We destroy the hoppers in the locations for several reasons, and these are not sentimental. In the first place, we save the crops; this obviates a famine, and, in the second place, the planters and farmers have not to contend with the fliers which would otherwise come from the locations and destroy their autumn and winter crops.

“This destruction of locusts by the arsenical solution has been done under my supervision for the past five or six years.

“To within a few weeks, the genesis of this method of destroying locusts occurred eight years ago in an experiment I conducted in one of the cane plantations directly I arrived in Natal. The following year the Government assisted two Coast Farmers’ Associations in destroying locusts and, the next year, a number of up-country farmers as well. This work was so successful that the Natal farmers urged upon the Government the necessity of enforcing the Locust Act stringently.

“Nowadays we destroy as far as we can in the locations—the money being provided by the Government. We call upon the farmers in Natal—and at their own request—to destroy the locusts on their lands. There have been only one or two occasions on which we have been compelled to prosecute farmers under the Law. There have been many instances in which it might have been desirable to prosecute.

“My personal feeling in the matter is outlined in the first report to the Natal Government on locust destruction, and is practically the scheme since adopted by the Transvaal. I feel that an invasion of locusts is a matter of providence, and I think it is a very hard thing for the farmer afflicted to be compelled to destroy the pest wholly at his cost. When he does so, he is working for the good of his surroundings, and for the whole Colony, and I therefore think that he should be helped in his work by the State. If you decide on having compulsory legislation for the destruction of locusts, then let the State provide the materials.

"If a swarm of locusts invade a certain district, it is useless for one man to destroy. Nothing but combined action will be effective; and, therefore, if I may give an opinion in the matter, I will say that, for anything like success, compulsory legislation is absolutely necessary, because you have to get at those people who will do nothing.

"I do not think I can give you any further information.

"Natal has its legislation. It is being amended slightly this year by fresh regulations, and I have no doubt it will be further amended if necessary. It is a matter in which the whole of Natal supports its Government.

"I would notice that the Orange River Colony has lately passed an excellent Law, and it would be advisable for the other Colonies to have compulsory legislation too, but in such a matter, you must first have the people of the country behind you."

East Coast Fever.

REGULATIONS AND RESTRICTIONS.

By a Government Notice issued early in October that portion of the Umsinga Division south of the Tugela River was constituted, for the purpose of carrying out the provisions of the East Coast Fever Acts and Regulations, a portion of the infected area included within the Magisterial Division of Weenen. On the 12th October the Magisterial Division of Nkandhla (Zululand) was declared a separate infected area within the meaning of the E.C.F. Act, and the ingress, egress, or movement of cattle into, from, or within that area was prohibited.

By the provisions of a Government Notice issued on the 7th October, no further permits are to be issued for the removal of slaughter cattle from the Magisterial Division of Dundee south of the Vryheid railway line; from the Magisterial District of Umsinga, and from that portion of the Klip River Magisterial District on the east of the main line of railway in the vicinity of Wessel's Nek, which is an actually infected East Coast Fever area, except in cases where the applicant for a permit has purchased the whole of the horned stock belonging to any one individual, as provided for under the amended East Coast Fever Act of 1907. All permits issued expired on the 12th October.

Tabakscultuur in Zuid Afrika.

MET SPECIALE TOEPASSING OP NATAL.

Door E. R. SAWER, Directeur, Proef Stations.

(*Vervolg.*)

TABAKS MESTEN EN FERTILISEERDERS.

TABAKSOORTEN, ander dan pruim blad en snuifsoorten, worden bebouwd en vervaardigd voor de produkten van combustie of rooken, en hunne brandende hoedanigheden zijn derhalve van het eerste belang. Het woord "branden," als toegepast op tabak, heeft betrekking op verscheidene goed bepaalde kenmerken die alle door den planter en den vervaardiger in aanmerking genomen moeten worden. Om den koopers aannemelijk te zijn moet het bewerkt blad stadig en gelijkmatig vuur houden zonder eene strekking om te "verkolen" of "carboniseeren" verder dan de werkelijke brandende plek. Combustie moet voldoende trapsgewijs zijn om ontvlammende of ontploffende actie te verhinderen, en verder vereischt de markt dat het mineraal overschot, of "asch," wit van kleur en fern aaneen moet zijn. De afwezigheid van eenige dezer hoedanigheden mindert de waarde van het blad of de vervaardigde producten ernstig, en, daar men ze kan beheeren door een zorgvuldige keus van localiteit, grond en mestsoorten, zal eene bespreking van de methoden beschikbaar om een bevredigend resultaat op te leveren niet onpasselijk zijn.

Het tabak blad wordt gekenmerkt door een ruim inhoud van minerale stof, die dikwijls 20 per cent. van het totale gewicht te bovengaat en een aller belangrijkste uitwerking heeft op de combustie van het organisch materiaal. De groeiende capaciteit van tabak is afhankelijk van de groote evenredigheid der minerale zouten en als deze onttrokken worden zal het blad opvlammen. Dus gebeurt het dikwijls dat grove geile tabak een neiging toont te ontvlammen wanneer aangestoken hetgeen te wijten is aan een aanmerkelijk gebrek aan minerale bestanddeelen; en, desgelijks, kan de verwijdering van oplosbare zouten door "wasschen" of "doopen" van het blad voor het op te rollen de brandende kwaliteiten schadelijk aandoen. Zekere stoffen belemmeren de combustie terwijl andere het bevorderen en de betrekkelijke hoeveelheden van voorge-noemde en laatstgenoemde zullen den aard van het branden bepalen.

De moeielijkheid om een voldoende hoeveelheid kraalmest gedurende het tegenwoordige seizoen te verkrijgen, wegens de verwoestingen aangericht onder onze beesten door Oost Kust Koorts, verleent een

additioneel belang aan handels fertiliseerders als alternatief. Dit gevolg is niet heelemaal te betreuren, want het onbeperkt gebruik van grove organische mesten heeft in het verleden de maatstaf van veel van het plaatselijk blad verlaagd, en de vervanging van minerale fertiliseerders behoort het gewenschte effect te hebben om een fijner type blad met een meer delicaat geur te produceeren.

Een zekere hoeveelheid organisch stof in den grond is, echter, noodwendig voor goede resultaten en bevordert verder het behoud van vocht gedurende perioden van droogte. Als deze te kort schiet dan wordt het best aangebracht door een groene mest oogst onder te ploegen hetzij voor of na het planten van de tabak. Wolfsboonen, de roode kaffer boon, koe erwt en soja boon zijn geschikt voor dit doel, en behooren met de afsnijdende schijf weggesneden en onder geploegd te worden zoolang zij bloeien. Op deze wijze kan uitputting van den grond verhinderd worden en dezelfde grond herhaaldelijk met tabak beplant worden.

Vele der fertiliseerders in algemeen gebruik voor de voornaamste gewassen zijn niet geschikt voor tabak, en de keus moet gegrond worden op een duidelijke kennis van den invloed der verschillende beschikbare zouten op de brandende hoedanigheden van het blad. Het is herhaaldelijk duidelijk aangetoond dat alle chloor en zwavelzuur zouten benadeelen de brandende en vuurhoudende capaciteit van het blad, terwijl, aan de andere hand, zouten van potasch en kalk aangebracht moeten worden in een of anderen vorm. De vuurhoudende capaciteit hangt inderdaad af van de aanwezigheid van potasch, en kalk is noodig voor het produceeren van een goed gekleurd vastklevende asch. Phosphoorzuur zouten zijn practisch neutraal in hun effect op het branden doch voordeelig in zoo ver als zij de kracht van het gewas kunnen vermeerderen zonder de kwaliteit van het produkt te beschadigen. Waar een lichtgekleurd, milde geur blad gewenscht wordt, moet men stikstof (nitrogeen) houdend mestsoorten heel spaarzaam gebruiken, daar zij een aanmerkelijk effect hebben op de hoeveelheid nicotine, en zijn gevolgelijk aangewezen, aan de andere hand, voor prop, snuif en andere sterke soorten tabak.

De meerderheid van onze gekeurde tabaks gronden bevat een merkbare hoeveelheid kalk, niettemin zal het gewas in vele gevallen bevoordeeld worden door een toevoeging van deze prikkelstof, die niet alleen de blussching van den grond betert, doch tevens de snelle ontwikkeling der planten onderhoudt, ze meer spoedig door den wortelenden stadium brengende. Het chloor en zwavelzuur zout van het kalkmetaal moet vermeden worden, op welke kosten ook; zelfs in matige hoeveelheden zijn zij zeer schadelijk. In bijna alle districten moet de natuurlijke grond inhoud van phosphoorzuur zouten en potasch aangevuld worden na den eersten oogst door kunstmatige voorraden. Voorgenoemde behooren aangebracht te worden in den vorm van basic slag of phosphoorzuur waar transport van belang is, liever dan in den vorm van beenderen

phosphoorzuur zout dat minder gereedelijk beschikbaar is. Daar potasch niet aangewend kan worden als het chloorzout noch als het zwavelzuur zout om de redenen bovenvermeld, zijn de eenige practische bronnen van voorraad het koolzuurzout en het nitraat; feitelijk bevatten haast al de geoctrooide tabaks fertiliseersers laatstgenoemd zout als een essentieel bestanddeel. Een waarschuwing is noodig tegen het gebruik van de gemeener soorten handels nitraat dat dikwijls een schadelijke hoeveelheid chloorzouten bevat en men behoort een waarborg te krijgen dat deze geen twee per cent. van het totale gewicht te boven gaan.

Ten opzien van het feit dat eene tabaksnijverheid aangelegd is in afgelegen districten van Natal verwijderd van den spoorweg, is de kwestie van vrachtgeld en een allerbelangrijkste consideratie, en is een zeer geconcentreerd fertiliseerder wenschelijk. Een formule is dientengevolge opgesteld die een bepaalde betrekking heeft tot deze vereischte en tot de geaardheid van onze tabaksgronden, de corresponderende fertiliseerder bevattende zes deelen van geconcentreerde superphosphoorzuur zout, twee deelen nitraat van potasch, en twee van beenderenmeel. Deze complete minerale mest kan verschaft worden tegen den prijs van £8 5s. per ton plus vrachtgeld tot by de bestemde plaats van distributie, en behoort aangewend te worden in de evenredigheid van 200 lbs. per acre. Het voordeel gebruik van hooge prijs fertiliseersers is eene vingerwijzing tot succesvolle tabaks-aanplanting, en eene uitgaaf van £20 per acre in dit verband is geen buitengewone zaak in vele tabaks districten van de Vereenigde Staten, daar een voldoende winst opgeleverd wordt door de kwaliteit en het gewicht van het blad dientengevolge geproduceerd. Dat het tabak gewas zeer uitputtend is kan niet ontkend worden, en het is bewezen geworden dat een oogst van 6,000 lbs. verwijderd uit den grond 274 lbs. stikstof, 44 lbs. phosphoorzuur en 170 lbs. potasch, terwijl het overschot, namelijk de stengels en wortels 598 lbs. stikstof, 184 lbs. phosphoorzuur en 792 lbs. potasch bevatten. Laatstgenoemde kunnen en behooren in den grond teruggebracht te worden, maar de vereischten der bladeren, zonder meer, noodzaken de gedurige aandacht tot aanvulling van onze tabaksgronden als men uitputting wil verhinderen, voor welk doel een zorvuldige rotatie van gewassen, een stelsel van groen mesten en geschikte fertiliseersers regelmatig aangewend moeten worden.

VERPLANTING.

Het doel van den tabakplanter behoort te zijn om het gewas tot rijpheid te brengen binnen zestig tot zeventig dagen na de verplanting. Zulk een resultaat kan alleen verzekerd worden wanneer de grond tot de best mogelijke fijnheid gebracht is door herhaaldelijk ploegen en eggen. Gelijke cultivatie is alleen dan veroorloofd wanneer er geen mogelijk gevaar is dat het water aan de oppervlakte van den grond zal blijven staan, en op alle landerijen, behalve die goed gedraineerd, behooren er "ridges"

opgeworpen te worden door twee vlakke voren samen te trekken door een lichte tuin ploeg. Dit systeem verhindert ook de beschadiging der blaren door bespating met modder wanneer het hard regent en verschaft bovendien een middel tot besproeiing van het gewas. Indien gewenscht kunnen heuveltjes gevormd worden door kruisvoren te trekken op zoodanige afstanden als men van plan is de plantjes in de rijen van elkander te zetten, waarna de twee open zijden van het heuveltje getrokken worden naar het midden en dan wordt de top plat gemaakt mer een graaf. De breedere ruimte tusschen de gewone typen pijp tabak geeft aan de ophooping het meerder voordeel dat kruiscultivatatie met de paarde-schop gedaan kan worden. Sigarette en sigaar tabaksoorten behooren, echter, veel dichter op elkander in de rij geplant te worden en, hoewel op een nieuwe plek de planter de beste afstanden moet bepalen door ondervinding, kan algemeen geconstateerd worden dat goede resultaten verzekerd moeten worden liever door de planten dik op elkaar te zetten dan ze te veel ruimte te laten. In Amerika wordt het gebruik van de paardeschop weerkaatst in een algemeene afstand tusschen de planten van drie tot drie en een halve voet voor vervaardigings typen, eene behandeling die slechts kan leiden in het geval van het fijner sigaar en sigaretten blad tot het verlies van hun kenmerkend fijnheid van vezel. De meerderheid der Cubaansche en Sumatra tabakken worden niet meer dan twaalf tot veertien duim van elkaar in de rijen geplant, hoewel eenige van de meer krachtige soorten tot twee voet van elkander geplant kunnen worden. De Turksche planten zijn betrekkelijk klein en behooren nooit te ver van elkander gezet te worden. De volgende schaal is op de Zuid Afrikaansche ondervinding gebaseerd en zal toepasselijk zijn op haast alle districten in Natal:—

Connecticut, Braziliaansch, Honduras, Burley, Medley Prior, van elkander geplant, 3vt. bij 3vt.—4840 planten per akker.

Cubaansch, Zimmer Spaansch, Sumatra, Havana, van elkander geplant, 3vt. bij 2vt.—7260 planten per akker.

Virginiaansch, Hester, Goldfinder, Warne, van elkander geplant, 3vt. bij 2½vt.—5808 planten per akker.

Turksch, van elkander geplant, 1½vt. bij 1½vt.—58,080 planten per akker.

Het werkelijk planten behoort te geschieden gedurende of na een regen. Als de dag bewolkt is kan men het werk vroeg aanvangen, maar als de voormiddag warm en droog is, behoort men met het planten te wachten tot de tweede helft van den namiddag ten einde de teere plantjes een gelegenheid te geven zich te herstellen en te vestigen in den koelen nacht. Zij zijn geschikt tot verwijdering naar het plantage wanneer de blaren de grootte van een dubbeltje bereikt hebben. Men zoekt uit die welk breede korte blaren hebben en die welke lange nauwe blaren hebben behooren verworpen te worden, want dit is een eerste

vingerwijzing tot de soort van blad dat de volgroeide plant zal dragen. Voor over te planten maakt men de zaadbedding ter dege nat en dan worden de plantjes los gemaakt met een tuin vork. Men kan ze dan trekken zonder schade aan de wortels door de blaren tusschen den duim en vinger te vatten en ze in een mandje plaatsen die goed bedekt moet blijven met een nat doek. Op de landerijen aangekomen neemt men ze op met de linker hand terwijl een gaatje met een vinger van de rechter hand midden in het heuveltje of "ridge" gemaakt wordt. Zorg dat het gaatje niet te diep gemaakt wordt en dat de worteltjes niet gedrukt of opgedraaid worden, want in zulk een geval kan het plantje misschien leven maar zal nooit goed vooruitkomen. Ook is het belangrijk dat de grond goed onder om den wortel komt, want als het bij de nek hangt zal de plant spoedig wegwijnen. Als water ter besproeiing beschikbaar is, kan het nu voordeelig aangewend worden om het gewas een vroege voorsprong te geven. Na verloop van drie of vier dagen behoort de oppervlakte om de jonge plantjes licht aangeroerd te worden om eenige korst die zich gevormd mag hebben te verbrokkelen en de tabaks fertiliseerder met de hand op elk heuveltje aangebracht.

Verplanting machines komen in algemeen gebruik nu alwaar de behouwing op een uitegebreide schaal georganiseerd wordt. Onder andere, opent de "Bemis Transplanter" een drill, plaatst een kleine hoeveelheid van de fertiliseerder bij elk plantje, bevochtigt het met een waterstraal en ten slotte hoopt de drill weer op. De planten worden door twee personen gezeten achter op de machine nabij de oppervlakte van de grond ingezet. De capaciteit van dit heel nuttig stuk gereedschap is zoowat vijf acres per dag.

"The farmer has got to be convinced that there is money in fruit, and until he is, he will contend that his time can be more profitably spent than in pruning trees whose yield is only useful to pigs."

—*The Weekly Post*, Bloemfontein.

It is estimated that growing pigs placed on rape at about twenty-five to the acre will for two or three months require only half as much again as sty-fed animals. Pigs running out like this also tend to become stouter and healthier than when in confinement. They will live and grow on the rape without a supplement of grain, but a small addition of the latter has been found profitable. Dry sows, however, will do well on the rape alone.

Reviews.

SHEEP AND WOOL.

AUSTRALIAN SHEEP AND WOOL : A PRACTICAL AND THEORETICAL TREATISE. By Alfred Hawkesworth, Lecturer in Charge of Sheep and Wool Department, Technical College, Sydney. Second Edition, 1906. Sydney : William Brooks & Co. Durban and Maritzburg : Adams and Co. 10s. 6d. ; post free, 11s.

THE history of farming in Natal is characterised by the number of oscillations, in practically all its branches, which have made the pursuance of agriculture often highly speculative. There is perhaps not a single considerable branch of farming of which this is not more or less true; and noticeably is it so in the case of sheep farming and the wool industry. The last great factor which influenced sheep farming in this country was, of course, the rinderpest plague of 1896, in conjunction with native sheep-stealing and the sales of large numbers of sheep after the last Boer War in connection with the repatriation of Dutch farmers. The prices of cattle, however—great changes in which were brought about by the rinderpest scourge—have remained the governing factor in our wool production. When cattle prices are high, sheep-farming is found to be less profitable than the breeding of cattle, and accordingly the wool industry suffers. Sheep prices perhaps then go up, and a reversion to sheep-farming takes place for a while, and so the oscillation goes on.

The state of our wool production may be judged from the following statement, which gives the quantities of wool produced during the years 1894-1906:—

PRODUCTION OF WOOL, 1894-1906.

Year.	Wool Produced. lbs.
1894	1,942,352
1895	2,807,475
1896	2,085,232
1897	1,518,400
1898	1,747,159
1899	No Returns.
1900	1,773,231
1901	1,570,095
1902	2,043,160
1903	1,517,437
1904	1,367,856
1905	1,793,630
1906	1,884,615

From this there is seen to be a tendency to regain the level of pre-rinderpest days: at any rate there seems ample justification for saying that the industry is prospering—though certainly not to the extent that it should. This year, too, is said to be a record lambing season, which in itself is sufficient indication of what the Colony's possibilities in this direction are.

Sheep-farming, in common with every other branch of farming in Natal, is bound to go ahead; and there is every warrant for the prosecution and extension of the industry upon intelligent lines. There are many points to be considered. There is, for instance, the primary need for careful breeding. Climate and soil have an influence upon the constitution of the sheep, and so upon the quality of the wool, not always counted upon by sheep-farmers. Then care must be exercised in the feeding and management of the sheep. The principle of the "survival of the fittest" is true everywhere: it is the careful man, exercising every discretion and bringing his intelligence fully to bear upon the problems that confront him, that succeeds and eventually reaches the top of the tree. The third important consideration of the sheep-farmer is the clipping, grading, packing and marketing of his wool—another direction in which excellence tells.

It is attention to these important points that has placed the sheep and wool industry upon the successful basis and has brought about its development on the gigantic lines that has made Australia famous. Of all the States, Tasmania has led the way. By scientific breeding, sound judgment, carefulness, assisted by the climate, the Tasmanians have surpassed the breeders of all other countries, producing from the imported stock an all-round improved merino sheep. It is a question whether any other country can at the present time count as many high-class merino sheep as the breeders of Tasmania. In the early years of the past century the Van Dieman's Land Co. entered extensively into the pastoral industry of the island, with the object of supplying England with wool, so as to make her independent of foreign supplies. A large tract of country was secured, and thither large consignments were made from the best and purest Saxony flocks. From 1825 to 1830 that company expended £30,000 in the importation of sheep. In the year 1830 there were in the possession of the company 60,129 sheep, including lambs. Mr. W Warrington in 1829 imported 45 rams and 100 ewes of the Electoral breed, from Saxony, as well as pure Negrettis, costing £16 18s. per head. This latter flock was kept separate, and is known as Trimmer's flock. The foundation of the Tasmanian flock was laid with the purest merino types procurable. As time advanced, so did the flocks improve, eclipsing in every minute detail the imported sheep.

In Australia the pioneers had to take what sheep they could get from the few ships calling at the ports, but with them they made a noble start. Considering the great distance from Europe, and the means of

communication, the rapid advance that took place is all the more startling. It is a little above a century ago when sheep were unknown in Australia. The first importations were of such inferior types as to give one the idea that they were totally incapable of any improvement. They were thin, narrow, long-legged, flat-sided, razor-backed sheep, with covering more like hair than wool. This was a miserable foundation on which to build such a gigantic industry; and the happy results that have been brought about have been obtained by patience, perseverance, and good judgment, greatly assisted by natural causes through climate and pasture.

It is to Australia, then, that we naturally turn in seeking information and instruction in the sheep and wool industry; and it is from Australia that we expect to get the best results of studies prosecuted in this line. Farmers in South Africa will accordingly welcome the appearance of the second edition of Mr. Alfred Hawkesworth's treatise on "Australian Sheep and Wool." Mr. Hawkesworth, who is lecturer in charge of the Sheep and Wool Department of the Sydney Technical College, writes with the authority of an expert; and his advice, descriptions, and opinions constitute perhaps as complete a text-book upon the subject as could be wished, from the point of view of the student as well as from that of the selector, farmer, merchants, and others interested in the sheep and wool industries.

Commencing first with a description of the sheep from a zoological point of view, the author proceeds to enumerate the various varieties of sheep, which he classifies according to their European, Asiatic, African and American origin. Sections dealing with climate and pasturage, breeding, choice of animals, and flesh-sheep follow. Merinos, Lincolns, Leicesters, Cotswolds, North Devons, Romney Marsh sheep, Border Leicesters, Cheviots, South Downs, Shropshire Downs, Suffolk Downs, Hampshire Downs, Dorset Horns, Oxford Downs, and other types are all described and illustrated, a description of the class of wool produced by each variety rendering the accounts complete and valuable. The Angora goat, too, occupies some attention. Sections on breeding, management and judging complete the first half of the book, devoted to sheep proper.

The second half of the work deals wholly with wool, and is characterised by the thoroughness with which the author goes into the whole subject, from a preliminary account of the structure of the skin followed by a description of the nature and growth of wool to wool classing and washing, degreasing, and fellmongering, and preparing sheep-skins for market. Illustrations and descriptions are given of different types of wool; and the various properties and qualities of wool are treated of. The book is brought to a conclusion with some "hints to selectors and farmers," notes on the manufacture of wool, and statistics. We can commend this useful book to the attention of all interested in the sheep and wool industry. Messrs. Adams & Co., of Durban and Maritzburg, have imported a number of copies from Australia—where the book is published—and are selling them at 10s. 6d., post free 11s.

CO-OPERATIVE CREDIT.

CO-OPERATIVE BANKING : ITS PRINCIPLES AND PRACTICE. By
Henry W. Wolff. London : P. S. King & Son, 1907.

There are people who will tell you that agriculture does not "pay." They go into the "whys" and the "wherefores" of the matter and seek to convince you that "things are not as they used to be," and that the calling of agriculture is a profitless one. There is a modicum of truth in their contentions; things are, indeed, not what they used to be; and agriculture very likely does not pay—when conducted on the old lines. But the truth is that there is no calling that pays better in small hands when there is plenty of money to work with. Only, in all our callings, agriculture has been the last to recognise this all-important fact that is the rule of the present day—namely, that you must have plenty of working capital. That is the mainspring of production. But the difficulty is, in the first place, to find your capital—and, to do so, you must borrow; and, in the second place, you must, from the very nature of the conditions which surround you as a farmer, be able to obtain your money on easy terms. That is one of the difficulties which beset modern farming practice, and it is that difficulty which is recognised and is gradually being alleviated in most progressive countries of the world by the institution of agricultural and land banks, people's banks, and so on. The same difficulty, too, is recognised by the various South African Governments, and we have recently seen the introduction of Bills for the creation of Land Banks in the Legislatures of the Cape Colony, Transvaal and Natal.

One of the leading authorities of the present day on the subject of agricultural credit is undoubtedly Mr. Henry Wolff, who is well known as the author of several standard works on the subject. His "Agricultural Banks: their object and their work," and his "People's Banks: a record of social and economic success," among other works, did much to bring the subject to the attention of the English-speaking world; and his latest book, on "Co-operative Banking," forms a valuable addition to the literature of agriculture credit. In his characteristic, piquant style the author enters fully into the questions involved in the solution of the problem and into the mechanism and rationale of the co-operative credit system, the principles and practice of co-operative banking being clearly set forth. There is, in addition, a long supplementary chapter on co-operative mortgage-credit, running into 57 pages.

Co-operative banks have been before the world, Mr. Wolff tells us, just about sixty years; and no country which has adopted them now wishes to do without them. That they have proved most useful helps to social advancement and agricultural and industrial development cannot be doubted. In Germany, where they have been longest established and have become most active in business and most powerful, they now provide millions of

money to turn to productive uses. It is, moreover, to the medium and small manufacturer and dealer, the artisan, the working man with the little needs of his household or his calling, the farmer and the small cultivator, that they bring longed-for and valued help. "A sovereign made available in that humble stratum," Mr. Wolff says, "doubles, trebles, quadruples itself in little time and brings relief proportionately to the largest number. And the same quantity of gold diffused in that wide stratum produces more happiness and prosperity in a nation than when lumped together with heavy gilding at high points. For a happy, well-employed and well-to-do working class necessarily means a prosperous nation. From the bottom the benefit in this application rises to the higher strata much more readily and more effectually than it is apt to filter down through the impervious lining of capitalist pockets. And so the effect of the wealth spreads out over the entire commonwealth."

The man who joins a co-operative bank joins it because he requires a loan which he is not able to obtain in other quarters except on terms which are either exceedingly onerous or else humiliating, and in consequence demoralising. All other legitimate sources of credit seem closed against him. The ordinary bank is barred to him as a credit institution; and in his hour of need he has no one to fall back upon except the charitable philanthropist, the usurer, the pawnbroker, or the tradesman. Our banking, as we have it, is, as Mr. Wolff points out, essentially *rich* men's banking, and was advisedly established to be such. It is, of course, quite true that bankers, made liberal by competition, to-day readily accept as customers comparatively small men with small balances and doing small business. Nevertheless, in the main, banking remains the wealthy man's special preserve. The explanation is simple. Credit presupposes security; it would not be legitimate without such. And there is—without co-operative banks—no security that the "poor" (using the word in its most comprehensive sense) can give, which could at all satisfy bankers. It is material possessions, a tangible, convertible pledge, or the knowledge of the existence of its equivalent, is alone what the banker requires; and it is for the people who are unable to supply just that material type of security that co-operative banking has sprung into being.

However, tangible property is not the only security which can claim credit value—nor, perhaps, Mr. Wolff thinks, even the best. A man may be effectually bound by other pledges. In Germany, among the higher classes, a man becomes ruined in social position if he fails to redeem a debt secured by an *Ehrenschein*, a promissory note for which he pledges his word of honour. Respect for him is gone, his class-mates will not look at him; if he is in the army or the public service, he forfeits all prospect of promotion, and may have to retire. He is held to have dishonoured himself. There is, as Mr. Wolff shows in the course of his book, plenty of security to pledge, only it is not of a description such as an ordinary

business bank could take or be expected to take. This implies what is the main factor in the problem, the providing of some new kind of security, which small men can give, collectively if not singly, the devising of some new pledge for credit such as will serve where there is no tangible security to offer. The solution of the problem is found in the application of the co-operative principle: "the only method by which weak men can remedy their individual weakness, such as in the present case we have to postulate, is combination, the joining together of puny efforts, so as by their collective effort to produce force. . . . However small may be the individual's power to give security, many small units combined may very well make up a sufficiency for moderate purposes. And once this result is brought about, additional forces may, as we shall see, be brought into play, with the effect of still further stiffening the power produced, and making the collective security go, in the end, a very considerable way."

Mr. Wolff goes fully into the machinery of co-operative banks, the ruling principle of which he lays down as a junction of forces, a sense of responsibility on the part of members, discrimination in the election of members, caution and enquiry in the granting of loans and vigilance in the control of their employment. It is only a good understanding of the principle, an intelligent application of the machinery, he remarks, which will produce good co-operative banking. Mere mechanical rule-of-thumb management must needs wreck the bank. That is the members' affair, and they should be very careful to secure good administration, for, as Leon Say reminds us "*il ne suffit pas d'avoir une bonne machine, il faut aussi avoir un bon mecanicien.*"

Mr. Wolff's book is one that should be in the hands of all interested in the subject of agricultural credit, and we can honestly recommend it as a clear exposition of the principles and practice of co-operative banking which it sets out to describe and explain.

A VISION OF THE FUTURE.—*South Africa* has informed its readers that Mr. Deane, Minister of Agriculture, told an interviewer that this year "the Colony will be able to export, owing to very favourable conditions, about 1,000,000 sacks of *flour*, and it was hoped that a suitable market will be found for it." This, as a very Utopian vision of the distant future, is more or less reassuring; but we fear we shall not upset the world's "flour" market to such an extent for some considerable time to come. Our wheat crop does not at present run into more than four figures in muids of grain! We presume our contemporary means that we hoped to export a million muids of *mealies*.

NATAL CITRUS FRUITS IN ENGLAND.—From all accounts Natal citrus fruits are doing well in Britain and a demand for the different kinds is being created that is likely to extend with the increase of our supplies.

Readers of the *Journal* who are watching the development of this trade will be interested in the following extract from the *Western Morning News* (Plymouth), for which we are indebted to the *Natal Review*:—“The pretty mandarine oranges from Natal, which have just been put upon the London market, have attracted considerable attention. Compared with ordinary oranges mandarines are small, but the specimens from Natal are fully developed, and the finest fruits of their class that have been imported for years. These Natal mandarines will be serious competitors with the Spanish mandarines, for shippers inform us that enormous quantities will be exported from the South African Colony to the British market in coming years. All the high-class retail fruiterers have some of these novelty fruits on show, and they find them greatly appreciated by the public, who are content to pay fancy prices for them. A leading citrus fruit grower of Natal now in London states that the cultivators there can ship any quantity of the Natal mandarines to reach this country from August, and that they have made arrangements to do large business in this direction in the coming seasons. The Natal mandarine is fragrant, exceedingly pretty, and possesses a very juicy and sugary flesh. Natal oranges are also on the English markets at the present time, and much inquired for by consumers, who prefer them to the ordinary Spanish fruit. Seedless oranges from California are popular. These giant oval fruits are high-priced, chiefly on account of their size and freedom from seediness. The specimens are of magnificent quality, and add to the attractions of the windows of the retailers. In the City sale rooms at Monument Yard, London, dealers incline to the belief that the South African orange fruit importations may revolutionise the orange trade of the United Kingdom, at least as far as the summer trade is concerned.” The report of Mr. White, who accompanied the first shipment of citrus fruit to England on behalf of the Natal Orchard Association, will be found in another part of this issue.

“At Vereeniging the steam plough turns over thousands of acres, and the yield increases year by year. The deep and steady cut, and the thorough stirring of the soil, are advantages which no ox-drawn ploughing can duplicate. The initial outlay is great—somewhere near £5,000—but in the North, the expenditure has been justified by the return, and no business man asks for more than that.”

—*The Weekly Post*, Bloemfontein.

Experiment Farms.

CEDARA.

To DIRECTOR EXPERIMENT STATIONS.—

The period under review dates from the 1st of August till date of writing, viz., 18th October.

The work in the various branches of this section of the Farm has proceeded satisfactorily, and field work in particular received special attention in order that ploughing, cultivating, etc., might be well in hand for the planting of crops as soon as the rains commence. Unavoidable circumstances caused us very serious delay last season in getting the crops dealt with properly, and consequently the results were not as they would have been had they been planted in season.

There was no rainfall during the month of August. On the 10th of September considerably over an inch fell; and by the end of the month on the Hill and Vlei Stations, 2.02 and 2.17 inches respectively were registered. Little over $\frac{1}{2}$ an inch has fallen during the current month, though at date of writing it is heavily overcast, and there is indication of more rain. Though the month of August was cold throughout, it was warmer during September, 92 degs. being the maximum temperature registered and 36 degs. the minimum.

Up to the beginning of September and until the first rain of the season fell, the veld was extremely dry and afforded little grazing for stock. Since then it has made a good, steady growth, and now there is good grazing and the working oxen are improving in condition.

Thirty acres of mealies were planted a month ago to serve the double purpose of a trap crop for the mealie moth, and of supplying material for ensilage. This crop will, of course, be heavily infested with top grub and have to be cut early in January before the second brood of moths emerge to infest the main crop of mealies planted for grain in this district in the middle of November.

A similar trial was made on the Farm three years ago, but whether the actual result was a benefit to the main crop it is difficult to say, as I am of opinion that unless co-operation with neighbouring farmers be organised the effect cannot be satisfactorily determined. In the February, 1904, number of the *Agricultural Journal* the Government Entomologist deals with this matter.

Ground has been surveyed and allotted into three paddocks in which

various crops have been, and will be, organised, with a view to the conduct of pig feeding experiments. To date, Jerusalem artichokes and ground nuts are planted and are showing up well, while later on the remaining area will be planted out with kale and beans. When the crops have matured the pigs will then be allowed to run and feed upon them. The necessary fencing has been done, and portable housing is in course of construction.

A portion of the eastern swamp has been reclaimed for the purpose of growing rice. This has involved a good deal of labour in bringing into a suitable condition, as also the formation of embankments and drains to control the water when flooding the crop.

In the vegetable garden further plantings of seeds have been made, and the earlier plantings are doing well.

At this season of the year, when implements require overhauling for cultivating and planting, it is a busy time in the workshops; consequently both the engineer and carpenter have been fully employed in a class of work I consider most useful to the students.

The farrier and bricklayer continue demonstrations fortnightly in their respective branches; with the aid of students the latter has built a manure pit and foundation and pit for a circular saw that has just been secured.

A very interesting demonstration has been made with the working of a Mole Plough, kindly lent by Colonel Sir Duncan McKenzie. The object of the implement is to mould an underground channel at the required depth to lead into the main open drain. It can be used to the best advantage by being worked on the ground requiring draining prior to the main drain being cut. A photograph of the plough has been taken, which may be of interest to readers of the *Journal*.* It is an implement not generally known in the Colony at present, but once its advantages are recognised, it will find favour with many farmers.

All the working stock are healthy, and a further lot of mules has just been received on loan from the Transport Department which will be of great service for field work. There are now 21 Persian lambs, which are all shaping well. The poultry are doing well, and the result of the incubator hatching has been very satisfactory.

ALEXANDER REID,

Farm Manager.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

During the past month the chief feature has been the cleaning of the various crops and roadways. The former operation does not only mean

* This will appear in the next issue of the *Journal*.

the eradication of weeds. For instance, on a half-acre plot of imported oats growing here, there is a large percentage of barley—I should say, not less than 15 per cent.—and, as it is the intention to harvest the oats for seed, a lot of work has to be done before the crop is thoroughly cleaned, as the barley does not pipe all at the same time. This is not an isolated case; and farmers would be well compensated for the extra labour expended on thorough cleaning of the seed crop.

The two lucerne sections mentioned in my last report have been planted. The Quantities of Water Section, having received a light shower of rain soon after planting, is now well above ground, but is suffering considerably from the incessant hot north winds which are very prevalent at this time of the year.

Some 20,000 onion plants have been planted out on the truck section. One line of sugar cane (Uba) has been planted, along two sides of the paddock allotted to truck crops, also across centre of block. Being planted on the side of a road, the loss of ground will not be felt, while the benefit which will be derived from the breakwind will compensate for the extra labour entailed.

The oats on the Drainage Section have been harvested, and you will be furnished with a report at an early date.

I enclose herewith photos of the plots of Indian oat, Cape barley, barley wheat and rye of Arbruzzes.* The crops at present are very instructive in showing what can be done with a light dressing of artificial manures and judicious cultivation.

The work of refitting interior of tobacco barn is being taken in hand, so that a larger quantity of leaf may be treated at each filling.

We have had three light showers of rain during the month, totalling 1.62 inches. The maximum temperature was 93 degrees. As the natural veld is still dry and bare, I have been compelled to graze the cattle on half of the imported grass paddock, the other half being left for hay.

W. HOSKING,

Curator.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

All hands have been extremely busy during the month of September cutting, thrashing, weighing, carting and trucking sugar cane, about 200 tons being dispatched to date.

Excellent results have been obtained from the Uba Cane Manure Section, considering it is only 19 months old and a first ratoon crop. While the Uba canes have given such excellent results, the heavier canes,

such as Green Natal and Lousier are miserable failures and do not appear to be at all suited for light sandy soils. In appending results of the two seasons' cuttings it will be advisable before making comparisons to note that Plots 119, 120 and 121 had to be used as a roadway for carting the cane from the various sections during the 1906 cutting (owing to the inaccessibility of the other roadways), thus causing the ground to set very hard. Needless to state, this had a very deleterious effect upon the crop, most of the cane being stunted in growth and very thin. With care and attention during the early stages of its growth this season we should be able to bring the crop and the land back to their normal conditions, thus securing uniform results at next season's cutting. Plot 101 dressed with a light complete manure has given the best result, producing at the rate of 46 tons 125 lbs. to the acre, Plot 102, "no manure," coming next with 44½ tons to the acre. Taking the two seasons: Plots 106 and 124, dressed with superphosphate and chloride of potash, have given the best average results, viz., 38 tons 987 lbs. per acre.

UBA CANE MANURES.

Plots 24ft. x 145ft. = 2-25ths of an Acre.

Plots.	Manures.	Cut January, 1906.		Cut September, 1907.	
		Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.
			lbs.		lbs.
½B	No Manure	2,612	32 1,300	4,028	50 700
101	<div> <div>120 lbs. Sulphate of Ammonia</div> <div>60 „ Concentrated Super-phosphate</div> <div>50 „ Chloride of Potash</div> </div> per acre	5,797	36 462	7,370	46 125
102	No Manure	5,051	31 1,137	7 120	44 1,000
103	<div>240 lbs. Sulphate of Ammonia</div> <div>120 „ Concentrated Super-phosphate</div> <div>100 „ Chloride of Potash</div>	5,958	37 475	6,926	40 1,575
104	<div>360 lbs. Sulphate of Ammonia</div> <div>180 „ Concentrated Super-phosphate</div> <div>150 „ Chloride of Potash</div>	5,697	35 1,215	6,282	39 525
105	No Manure	5,433	33 1,912	6,250	39 125
106	<div>120 lbs. Concentrated Super-phosphate</div> <div>100 „ Chloride of Potash</div>	5,854	36 1,175	7,007	43 1,587

UBA CANE MANURES.—Continued.

Plots.	Manures.	Cut January, 1906.		Cut September, 1907.	
		Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.
			lbs.		lbs.
107	{ 240 lbs. Sulphate of Ammonia } 100 „ Chloride of Potash } per acre	4,951	30 1,987	6,226	38 1,825
108	No Manure	4,660	29 250	6,235	38 1,937
109	{ 240 lbs. Sulphate of Ammonia } 120 „ Concentrated Super-phosphate } per acre	4,781	29 1,762	6,326	39 1,075
110	120 lbs. Concentrated Super-phosphate ... per acre	4,607	28 1,587	5,997	37 962
111	No Manure	4,336	27 200	5,137	32 212
112	300 lbs. Basic Slag ... per acre	4,515	28 437	5,605	35 62
113	300 lbs. Bone Dust ... per acre	4,903	30 1,287	5,818	36 725
114	No Manure	3,977	24 1,712	5,303	33 287
115	{ 200 lbs. Nitrate of Soda } 120 „ Concentrated Super-phosphate } per acre 136 „ Nitrate of Potash }	5,644	35 550	5,570	34 1,625
116	{ 240 lbs. Sulphate of Ammonia } 120 „ Concentrated Super-phosphate } per acre 100 „ Chloride of Potash } 1000 „ Lime }	5,262	32 1,775	6,299	39 737
117	No Manure	4,231	26 807	4,517	28 462
118	{ 120 lbs. Concentrated Super-phosphate } 1000 „ Lime } per acre	5,653	35 662	5,692	35 1,150
4B	No Manure	2,443	30 1,075	3,220	40 500
	Total lbs.	96,373	...	116,928	...

It will be noted from the above results that the average weight of cane from all plots from 25 months old cane in 1906 was $31\frac{3}{4}$ tons per

acre, whilst from 19 months' old cane in 1907 the average weight from all plots is $38\frac{1}{2}$ tons.

The results from the check section do not show any marked differences, the yields being for the two seasons practically the same. The following are the results:—

UBA CANE MANURES.

Plot 24ft. x 145ft. = 2-25ths of an Acre.

Plots.	Manures.	Cut January, 1906.		Cut September, 1907.	
		Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.
$\frac{1}{2}$ B	No Manure ...	2,300	28 lbs. 1,500	3,678	45 lbs. 1,950
109	Same as Plot 101 ...	5,799	36 487	4,879	30 987
120	No Manure ...	4,756	29 1,450	4,478	27 1,975
121	Same as Plot 103 ...	5,189	32 815	4,261	26 1,262
122	" , 104 ...	5,408	33 1,600	5,702	35 1,275
123	No Manure ...	4,450	27 1,625	4,931	30 1,637
124	Same as Plot 106 ...	6,236	38 1,950	5,539	34 1,237
125	" , 107 ...	5,318	33 475	4,986	31 325
126	No Manure ...	5,310	33 375	4,699	29 737
127	Same as Plot 109 ...	5,577	34 1,712	5,304	33 300
128	" , 110 ...	5,529	34 1,112	5,172	32 650
129	No Manure ..	5,004	31 550	5,275	32 1,937
130	Same as Plot 112 ...	5,324	33 550	5,426	33 1,825
131	" , 113 ...	5,289	33 112	5,642	35 525
132	No Manure ...	4,680	29 500	5,645	35 562
133	Same as Plot 115 ...	4,774	29 1,675	5,656	35 700
134	" , 116 ...	5,372	33 1,150	5,368	33 1,100
135	No Manure ..	3,832	23 1,900	4,810	30 25
136	Same as Plot 118 ...	4,927	30 1,587	4,921	30 1,512
$\frac{1}{2}$ B	No Manure ...	2,450	30 1,250	2,434	30 850
Total lbs.		97,524		98,806	

Great credit is due to the two students stationed here for the capable way in which they have handled the cane, weighing on a small platform scale and helping to load from 10 to 12 tons per day.

Nearly 4 inches of rain fell during the month. The land is in good condition for ploughing, and we hope to have two teams going in the course of a week or two as soon as the cane cutting is finished.

All stock have wintered well and are in good condition.

W. JOHANSEN,
Manager.

Laboratory Notes.

TOWARDS the end of July an examination of the Uba cane grown under Plots 101 to 118 and 119 to 136 was made at the Winkel Spruit Experiment Farm in order to ascertain the effects, if any, produced by different forms of manuring.

In conjunction with this work, the Manager of the Winkel Spruit Farm has sent in his report giving the weights of cane obtained from the various sections and the particulars of the manurial treatment which was given effect to in the individual plots.

The analysis was performed in July, and wet weather had set in before the cane was cut in September. This may have affected the juice to some extent, but there is little likelihood of any material change in the weight of the cane itself.

The canes examined were average ones taken from the two inner rows of each plot; this was considered advisable in order to avoid the risk of any influence which may have extended to the outer rows from the adjoining plots. The border plots were excluded owing to their being subject to outside influences.

After being cut, the cane was weighed, topped, re-weighed and immediately afterwards passed through the hand crushing mill. The weight of the juice so extracted was ascertained, and from it the extraction per weight of cane computed under the heading of "Per cent. of Juice by Mill." These figures, which average about 50 per cent., are given in the above columns.

The further calculations were based on this extraction, consequently they do not represent the full value of the cane when subject to the double or treble crushing of modern power mills. An approximate return

of the sugar per acre by a 60, 70 or higher per cent. of extraction may, however, be calculated from these figures. The values of the normal juices, together with the weights of cane, give the relative yield of each plot and afford a basis of comparison.

AVERAGE RETURNS PER ACRE.

PLOT Nos.	UNMANURED.		MANURED.	
	Cane. Tons	Saccharose. Lbs.	Cane. Tons	Saccharose. Lbs.
108 to 118	36.10	7,833	38.85	8,236
119 to 136	31.01	5,945	32.68	6,442
Grand Average ...	33.55	6,889	35.76	7,339

The difference in yield, taking the whole of the manured in comparison with the unmanured plots, is thus found to be in favour of the former by 2.21 tons of cane and 450 lbs. of saccharose per acre. The highest yields in the manured portions are from those plots receiving a complete manure containing Nitrogen, Phosphoric Acid and Potash. in Plot 101 the light dressing is the most effective, and in No. 122 the heavy. A comparison of the individual influences of the single manurial constituents is less satisfactory, and is insufficiently marked to give pronounced recognition.

One peculiarity may be observed in regard to the returns from the unmanured plots, as shown hereunder:—

UNMANURED PLOTS.

No.	Cane. Tons	Saccharose. Lbs.	No.	Cane. Tons	Saccharose. Lbs.
102	44.44	9,163	120	27.88	5,321
105	39.05	7,790	123	30.73	5,769
108	38.86	8,939	126	29.32	5,805
111	32.95	7,382	129	32.86	6,579
114	33.12	7,240	132	35.25	7,318
117	28.20	6,497	135	30.05	5,878

In the first section a marked decrease takes place as the cane is further removed from the one extremity of the block, in the second a ten-

RESULTS OF CANE ANALYSIS.

Number of Plot.	Weight of Cane per Acre in Tons.	Per Cent. of Juice by Mill.	Normal Juice.					Gallons Juice per Acre.	Saccharose. lbs per Acre.	Manurial Treatment of Plot.
			Lbs. per Gallon.			Glucose Ratio.				
			Saccharose.	Glucose.	Solids, not Sugar.					
101	46'05	51	1'881	'013	'056	1'38	5,259	9,893	N.P.K. (Light).	
102	44'44	52	1'771	'015	'164	1'68	5,174	9,163	No Manure.	
103	40'70	48	1'958	'016	'043	1'62	4,374	8,565	N.P.K. (Medium).	
104	39'23	48	1'877	'014	'114	1'28	4,217	7,916	N.P.K. (Heavy).	
105	39'05	48	1'856	'010	'113	1'02	4,197	7,790	No Manure.	
106	43'70	50	1'868	'011	'090	1'15	4,894	9,143	P.K.	
107	38'81	51	1'935	'010	'010	1'02	4,455	8,621	N.K.	
108	38'86	50	2'054	'010	'031	1'00	4,352	8,939	No Manure.	
109	39'48	49	1'931	'015	'057	1'54	4,332	8,365	N.P.	
110	37'43	48	1'787	'018	'129	2'00	4,023	7,189	P.	
111	32'95	49	2'042	'022	'080	2'14	3,615	7,382	No Manure.	
112	35'02	50	2'020	'020	'024	1'98	3,922	7,922	P. Basic Slag.	
113	36'32	50	2'070	'044	'029	2'12	4,067	8,164	P. Bone Dust.	
114	33'12	49	1'993	'022	'048	2'20	3,633	7,240	No Manure.	
115	34'72	46	1'651	'036	'281	4'36	3,577	5,906	N.P.K. } Nitrate of Soda. } Nitrate of Potash.	

116	39'32	51	2'076	'044	'020	4'22	4,491	9,323	N.P.K. Lime.
117	28'20	48	2.144	'032	'017	2'98	3,030	6,497	No Manure.
118	35'51	47	2'094	'035	'010	3'34	3,736	7,823	P. Lime.
119	30'44	50	1'793	'070	'074	3'90	3,409	6,112	N.P.K. (Light).
120	27'88	46	1'853	'036	'151	1'94	2,871	5,321	No Manure.
121	26'56	49	1'699	'025	.286	1'47	2,914	4,951	N.P.K. (Medium).
122	35'56	52	1'837	'040	'143	2'17	4,141	7,608	N.P.K. (Heavy).
123	30'73	50	1'677	'037	'196	2'20	3,440	5,769	No Manure.
124	34'55	49	1'672	'036	'155	2'15	3,790	6,316	P.K.
125	31'14	48	1'875	'023	'226	1'22	3,346	6,274	N.K.
126	29'32	50	1'768	'037	'152	2'09	3,283	5,805	No Manure.
127	33'13	52	1'677	'049	'206	2'92	3,857	6,468	N.P.
128	32'29	49	1'919	'041	'180	2'13	3,543	6,800	P.
129	32'86	50	1'842	'044	'131	2'39	3,680	6,579	No Manure.
130	33'81	50	1'991	'032	'044	1'60	3,785	7,137	P. Basic Slag.
131	35'23	47	1'815	'036	'079	1'93	3,707	6,798	P. Bone Dust.
132	35'25	53	1'749	'044	'057	2'51	4,184	7,318	No Manure.
133	35'31	53	1'516	'050	'204	3'20	4,191	6,353	N.P.K. } Nitrate of Soda.
134	33'49	56	1'521	'033	'136	2'16	4,195	6,381	N.P.K. } Nitrate of Potash.
135	30'05	48	1'820	'040	'060	2'19	3,230	5,878	No Manure.
136	30'67	51	1'743	'034	'162	1'95	3,503	6,116	P. Lime.

dency is shown towards the opposite conditions. This same tendency to sequence is observable in the manured plots, but is somewhat masked by the manurial treatment, or it may be that the manures have slightly distorted or modified the regularity of the order. Without fully discounting this unconformity of the soil or the influence of some condition or agency which has had an apparent effect on the cane, it is difficult to apportion the true value of each manurial constituent. There is, however, decided evidence as to the value of complete manuring with a combination of Nitrogen, Phosphoric Acid and Potash.

The report by the Manager at Winkel Spruit gives details as to the manures employed and also the returns of cane cut in 1906 and 1907 from the same stools.

My thanks are due to the Manager (Mr. Johansen) at Winkel Spruit, Mr. Dwyer, and to Messrs Harvey and Tillitson (students), who ably co-operated in the carrying out of the work in connection with the analysis of the cane. Mr. Johansen may be able to favour us with some particulars as to the thrashing of the cane, as I understand there was some different treatment accorded to specified sections of the plots, and this may have made an appreciable difference.

ALEX. PARDY, F.C.S., etc.,
Analyst.

Gardening Notes for November.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

REGULAR sowings may be made for succession of dwarf Beans, Radish, Lettuce, Beet, Carrot, Tomato, Marrow, Mustard and Cress. Advantage should be taken of favourable weather for planting out Cabbages, Tomatoes, Onions, Leeks, Capsicums, Egg plants, Marrows and Cucumbers. The main sowing of Celery should be made the beginning of the month.

This is a good time to sow Leeks. Sow the seed in drills or broadcast for transplanting in well manured soil.

Cauliflower should be sown this month in the up-country districts, but not till next month in the warmer parts of the Colony. The best varieties are Early London and Autumn Giant. Brocoli is more suitable for the coldest districts, being more hardy, and should be sown this month.

Thin out any growing crops that are too crowded. This is especially necessary in the case of root crops, such as Carrot, Turnip, Beet, Radish, Onion, etc. The thinnings of Lettuce, Onion, and Beet may be used to form extra beds by planting them out in rows at the proper distance apart. The large varieties of Lettuce, such as Webb's Wonderful and Iceberg, generally make the finest heads when transplanted into rich soil, and the first-named variety will grow to an enormous size if allowed a space of two feet or so.

FLOWER GARDEN.

All kinds of tender and half-hardy flower seeds may be sown now, such as Balsam, Cockscomb, Amaranthus, Dahlia, Marigold, Heliotrope, Nasturtium, Cactus, Sunflower, Portulaca, Zinnia, etc. Where the Portulaca has been sown in previous seasons, young seedlings will be found now springing up in thousands from self-sown seed shed last autumn. These may be transplanted without any difficulty and can be used for edging sunny borders in the garden, and the more exposed to the sun the more brilliant the display will be. It does not thrive in shady, damp places. Seed may also be sown now both of the single and double varieties.

Where a permanent evergreen edging is preferred the new Shasta Daisy will be one of the best all round for winter and summer, as neither heat nor cold affects it. It is both dwarf and compact and does not spread so quickly as the old Ox-eye Daisy, and is therefore more easily kept within bounds.

When raised from seed, flowers vary considerably in size and length of stem, and quite distinct forms are often produced from one sowing.

Plant out Dahlias, Perennial Phlox, Pentstemons, Cannas, Japanese Anemones, Gladioli, Tube rose, Lily bulbs, Amaryllis, Mexican Poppies, Achilleas, Perennial Rudbeckias, Delphiniums, etc.

The Delphinium should be planted in a sheltered place with complete protection from north winds. They are seldom seen in our gardens, but in the up-country districts no garden should be complete without these beautiful perennials. Autumn is the best time to sow the seed to provide young plants for planting out in spring or early summer. The young seedlings should be picked out into small tins (old milk tins will answer the purpose), and then plant out when about six inches high without disturbing the soil, into permanent quarters, where they will spring up every season from the roots.

Chrysanthemums may be planted out this month.

Old stools should be cut down and taken up, divided into suitable sized pieces and replanted in good, rich soil. These will make good plants and will produce large sized blooms if freely disbudded.

The finest blooms are produced from cuttings struck in August and

September, and these should be ready for planting out about the end of this month.

If large show blooms are required, not more than three flowering stems should be allowed to each plant and only the centre bud on each stem must be allowed to develop. Those either under or near should be carefully rubbed off as soon as it can be done with safety, care being taken not to injure the crownbud. Immediately the buds begin to show, apply clear liquid manure twice a week and syringe the plants frequently with pure water in dry weather.

The plants from the first should be staked and each stem securely tied keeping them well apart.

The operations of budding and layering may now commence. Layering is an easy method of obtaining plants that are difficult to propagate from cuttings. Another advantage is that larger plants are at once obtained. Having selected a suitable branch, make a cut with a sharp knife on the under side just below a joint half way through and up about an inch or so. The heel thus formed must then be carefully pegged down and held fast by a stake with the branch tied in an upright position.

Where the soil is poor remove a spadeful from the spot where the layer is to be fixed and replace with some good soil. A mulch of some kind placed on the surface all round will conserve the moisture and facilitate the formation of roots. When the layers are rooted they may be cut off from the parent plant and be planted at once in tins or pots in a sheltered spot to become established before being planted out. Many varieties of Carnation that are difficult to strike from pipings may easily be propagated in this way.

Plant out in wet weather all kinds of evergreen fruit, ornamental trees, flowering plants and creepers.

This is the best season for the formation of grass lawns, either planting or sowing; or for planting new evergreen fences.

An estate of 12,000 acres, known as Inverliver, in Argyllshire, has just been purchased by the British Government for the purpose of converting it into a State forest station, at a cost of about £30,000. It is situated on the shores of Loch Awe, in one of the most sparsely populated districts of the Highlands, and is surrounded by mountains and moorland.

Correspondence.

GREEN MANURING.

A correspondent at Mt. St. Bernard writes:—

“Owing to the extremely high cost of fertilizers for manuring, local farmers have the intention to use more economical manuring, *i.e.*, green manure. Could any of the numerous readers of the *Agricultural Journal* furnish us with information as to the most advantageous crop used for green manuring. The cowpea, or lupine-pea, is considered very fertile, but it is very expensive in this country and difficult to procure; but, should the above peas be procurable, any particulars, as to the nature of same, cost, and where it could be procured, would oblige.”

[Some of our readers may have seed for disposal; or we would suggest that our correspondent place himself in communication with seedsmen in Maritzburg or Durban, from whom he would be able to get full particulars as to cost.

The advantages of growing cowpeas are thus summarised by the Louisiana Experiment Station:—(1) The cowpea is a nitrogen-gatherer; (2) it shades the soil in summer, keeping it in a condition most suitable to the most rapid nitrification, and leaves it pliable and loose and in the best condition for a future crop; (3) it has a large root development, and hence pumps up from great depths and large areas of water, and with it the mineral matter needed by the plant; (4) its adaptability to all kinds of soils, stiffest clays to most porous sands, fertile alluvial bottoms to barren uplands; (5) it stands the heat and sunshine of Southern summers; (6) its rapid growth enables the farmer in the South to grow two crops a year on the same soil; (7) when sown thickly it shades the soil effectually, smothering out all weeds, and thus serves as a cleansing crop; (8) it is the best preparatory crop known to the Southern farmer: every kind of crop grows well after it; (9) it furnishes a most excellent food in large quantities for both man and animals

On heavy clay lands which need loosening, the vines should be turned under green. The heavier the crop turned under the greater will be the beneficial action on the mechanical condition of the soil. On sandy soils which are already too light the vines should be grazed and left on the surface to decay. Where the vines are ploughed under the operation should be done in the autumn, and the ground immediately followed by some winter growing crop, such as rye, wheat, winter oats or vetch. The roots of these growing plants catch and hold the foods liberated by the decaying vegetable matter in the soil and thus prevent

winter leaching and washing. The following spring the green cover crop can be ploughed under and the regular crop of mealies or small grain grown. Where it is not practicable to grow this winter cover crop it is best in practice to let the vines lie on the ground over winter. This prevents the washing and leaching of the soil that would occur on freshly ploughed ground.

Two classes of plants are used for green manuring: those that gather nitrogen from them and in decaying add this valuable plant food to the soil, and those that cannot gather atmospheric nitrogen but simply utilise that already in the soil. The first class is by far the more valuable. It is composed of the leguminous plants such as lucerne, clover, crimson clover, cowpeas, velvet beans, soy beans, vetches, etc. To the second class belong such crops as buckwheat, rye, mustard, etc. According to the "Farmers' Cyclopaedia of Agriculture," a good crop of lucerne, crimson or red clover, cowpeas or velvet beans, will contain about 150lbs. of nitrogen, a large proportion of which is obtained from the air.

Green manures add no mineral matter to the soil other than that taken from it. They do, however, bring up such foods from the subsoil and store them in the leaves, stems, and upper portions of the plant. When the crop is ploughed under these materials accumulate in the surface soil, and thus become more available for succeeding crops. Such plants as rye, buckwheat and mustard add nothing to the soil on which they grow except humus. This, however, is of great value in the improvement of the physical condition of the soil, and for this purpose they may be used until the clovers or some other leguminous plants can be grown.

In selecting a crop to sow for bringing up worn-out or naturally poor soil, attention should be paid to its suitability for the soil, climate, and any particular local conditions. For instance, a plant requiring considerable warmth and sunlight, as the cowpea, should not be used as a cover crop in an old orchard affording much shade. For this purpose Canada field peas or clover would do better. In soils lacking lime (when lime is not easily obtainable) a plant capable of withstanding considerable acidity, such as the cowpea or lupine, should be chosen rather than clover or lucerne. In heavy clay soils holding much moisture, red clover or alsike clover will often succeed, though lucerne cannot possibly make a stand.]

The Missouri farmer who neglects to cut his thistles before going to seed is subject to a fine of 10 dols. The overseer of highways is authorised to cut thistles and other noxious weeds and charge the same against the land.

Animal Diseases in September.

EAST COAST FEVER.

EAST Coast Fever occupies a secondary place in the monthly report of the Principal Veterinary Surgeon (Mr. S. B. Woollatt) for September. In the Vryheid and Ngotshe districts, Mr. Woollatt reports, there were 15 fresh outbreaks; in the Babanango district there was one—the first to appear in this Magisterial Division, although on three sides the district has been surrounded by infection up to its actual borders for some time past; in the Dundee and Umsinga districts there were two outbreaks—that in the Umsinga district occurring in the Native Location, about twelve miles from the original centre of infection on the Sunday's River. The deaths during the month from East Coast Fever were as follows:—Lower Tugela and Mapumulo, 862; Wessel's Nek, 35; Umvoti County, 3; Durban County, 75; Muden, 1; Utrecht, 10; Dundee and Umsinga, 70; Inanda, 26; Vryheid, Ngotshe and Babanango, 700.

Large numbers of cattle have been removed for slaughter from these several infected districts, and the Compulsory Fencing Act has been in operation in the districts of Dundee, Ladysmith and Durban County. The branding of cattle is also still being proceeded with in Vryheid, Dundee and Durban County.

LUNGSICKNESS.

One fresh outbreak occurred in the Krantzkop district in a troop of cattle in contact with the original outbreak in this district. One animal only was affected, which has been destroyed, and the rest inoculated. In Alfred County another fresh outbreak has occurred, and another occurred at the beginning of the present month (October), making a total of three outbreaks. The amended Act has been put into operation; and, in so far as Alfred County is concerned, cattle have been prohibited from entering the rest of Natal, except for slaughter.

"Some months back," remarks Mr. Woollatt, "owing to the prevalence of lungsickness in the Cape Colony, it was considered necessary to prohibit cattle from that Colony entering Natal, but as previous to this arrangements had been come to with the Cape authorities with reference to Alfred County, in connection with East Coast Fever, making the Umzimkulu River the boundary line, to permit cattle transport between the Cape and Alfred County, cattle were not prohibited from entering Alfred County from the Cape under the Lungsickness Regulations; and before this County was excluded the public there, and their committees, were asked if they wished to be shut off from the Cape Colony, which they declined.

"Our action in prohibiting cattle from entering Natal from the Cape has been justified by the outbreaks which have occurred in Alfred County, where movement is still being permitted, and where, there is no doubt, the infection came from the Cape Colony."

SCAB.

During the month there were 14 fresh outbreaks of scab; and 22 licenses were raised.

The bulk of Mr. Woollatt's monthly report is taken up with remarks on this disease. Mr. Woollatt says:—

"At the present time the several Colonies have legislation dealing with Sheep Scab, all more or less on different lines, and yet the one Colony—this particularly applies to Natal—is very largely dependent on the other for winter and summer grazing for sheep, which necessitates a bi-annual trekking. This trekking of sheep is a practice which we cannot hope to dispense with—at least for some years to come—and must, therefore, be recognised as a feature of sheep farming in many districts—and while we recognise this trekking of sheep I think we should also frame our laws as to deal in the most stringent manner with actual outbreaks of scab, and give all the freedom possible in the movement of sheep from one Colony to another.

"Under the present system of each Colony having a separate Scab Act, we find that individual Colonies impose more or less stringent restrictions at their borders with a view to guarding against the introduction of diseased sheep, which must continue in force until a Scab Act, universally administered, is in force. The necessity for a universal Scab Act is brought home to everyone who knows the conditions which exist on the borders—particularly in the cases of Natal, O.R.Colony and Transvaal, where the border line is, in most cases, imaginary, and movement across the border frequently only constitutes a movement from one farm to another.

"The Scab Act of Natal, which was made Law in 1887, recognises this winter and summer trekking, and made special provisions for dealing with it, which, in my opinion, would have been perfectly justified had proper Scab Acts been in existence in the Colonies from which the sheep were coming to us; but as in the past satisfactory legislation did not exist, these special provisions were the means of bringing numbers of infected flocks into Natal annually from the old Free State. Doubtless infected flocks also returned from Natal. As proof of this, prior to the recent legislation introduced in the O.R.Colony against sheep scab, the returns for scab in the Northern Districts, which occurred among sheep running there during the winter months, showed a high percentage to be infected, and since the enforcement of the O.R.Colony's Act these outbreaks have been reduced by fully 75 per cent. The Transvaal returns show 800 outbreaks and the O.R. Colony 550 existing at present.

This reduction in the amount of scab in these districts must, I think, be accepted as ample proof of the number of infected flocks which used previously to be brought into Natal from the O.R. Colony, which was largely brought about by the provision in the O.R. Colony's Act requiring simultaneous dipping in the autumn, just prior to the sheep entering Natal. We still have to contend, however, with the fact of many of the passes in the Berg and the routes the sheep travel along being grossly infected with scab, and for this reason we should stringently enforce the dipping on arrival at their destination in Natal.

"It was ruled by the Law Department that, under the Act of 1887, a flock of sheep actually affected with scab could enter under Section 20, and we had no power to stop it. We could, of course, prosecute the owner for travelling scabby sheep, but he could still proceed to his destination.

"As regards the Natal Act, it does not provide for the dipping of sheep to be carried out by a Stock Inspector if the owner fails to clean his flock himself. If such provisions existed, as it does in the laws of some of the neighbouring States, we could deal in a much more satisfactory manner with the outbreaks in Native locations, where numbers of flocks, often consisting of from ten to twenty sheep, are grossly infected, and will continue to be infected while they are allowed to run on infected pastures and kraals, no matter if they are dipped in accordance with the license or not.

"If we possessed the powers above referred to we could send a man in these localities with portable dips to carry out a systematic dipping for a prolonged period at the owners' expense, which must be recognised as the only possible way of eradicating from such localities, short of prohibiting the keeping of sheep. The same applies to many farms where the veld, kraals, etc., are so infected that, short of this practice or the prohibition to keep sheep for a definite period, outbreaks will still continue to crop up. This also applies to those sheep constantly shown as being under license. The Scab Act makes no provisions for the disinfection of premises or kraals, but under the Contagious Diseases Act of 1894, we have certain powers in this direction, but it is not practicable to disinfect kraals or pastures which are as great a factor in the dissemination of sheep scab as the sheep themselves. Further, those who have had experience of the working of the Scab Act know that, if an owner complies with the conditions of the license and after its expiration the Inspector is unable to certify that his sheep are scabby, he must release them, although such Inspector may know that his premises are infected, with a result that it is only a matter of time before fresh cases crop up, unless the owner can be prevailed upon to place his sheep on clean pasture after dipping, which cannot always be carried out, as there are many cases where the whole of the farm is infected. In such cases where the whole of the farm is infected we must either have power to

dip periodically—scab or no scab—or the sheep will have to be removed from such a farm for a definite period. Under the existing Act the owner of sheep may have scab for six months at a cost of £8 only, in the way of 2nd and 3rd licenses, whereas in some of the neighbouring Colonies the Scab Acts provide for a fine on each sheep infected with scab after an opportunity has been given to the owner to clean them.

"We can understand those individuals living in districts in the Colony in which no winter or summer trekking takes place being struck with the fact that some districts always appear to show a far greater number of scabby flocks than others, but this does not, as is implied, mean that the Stock Inspector in the one district is a more able or energetic man than the official in the other. This condition of affairs will, however, always exist while we have this trekking of sheep and Native sheep owners.

"Speaking generally, the eradication of scab in any one Colony is a South African question. It would be futile for any one Colony to incur the expense necessary to attempt to ensure the eradication of scab and maintain a clean bill, unless the other Colonies took the same action; and to ensure unanimous action in as perfect a manner as possible it would necessitate one administration, as, no matter what restrictions we placed on our borders, our borders are such as will permit sheep being brought over without passing through a port of entry or without being inspected, and when we see the neighbouring Colonies are infected with scab—probably to a much greater extent than we—this fact must be realised.

"Sheep scab is a disease which can be eradicated if proper measures are taken and stringently enforced. It is not a question of the success in dealing with sheep scab being in direct proportion to the amount of money spent on it, but in direct proportion to the support which is given by each sheep owner. According to the reports from the Cape Colony, £80,000 a year is spent on sheep scab; and, as far as I can gather from the report of the Chief Scab Inspector, notwithstanding this amount the chief success obtained is in those districts where the farming community recognise the policy of doing all they can to eradicate the disease from their own flocks. . . .

"The Natal Act makes no provision for any special dips to be used, this being left entirely to the discretion of the owner of the sheep. This is right probably in the case of men who make a real effort to clean their flocks, but we know from experience that there are many who make a farce of dipping to be able to say they have dipped and thus escape the prosecution for not complying with the conditions of the license.

"Inspectors have instructions to personally inspect the dipping whenever possible, but in this connection experience has shown that many owners have so arranged things as to render inspection impossible, unless the Inspectors could visit every day during the time in which the Law

requires the dipping to take place. At the present time, in those sheep districts infected with East Coast Fever, the Stock Inspector's duties are particularly heavy, and there is no doubt that the amount of time it is desirable to give to the administration of the Scab Act cannot be given."

GLANDERS.

Eight animals which reacted to the mallein test were destroyed, three in Durban, one in Dundee, and four in Vryheid. One clinical case occurred in Vryheid district.

IMPORTATIONS OF STOCK BY SEA.

During September there were imported into the Colony by sea, 3 horses, 68 sheep, 100 pigs, and 8 dogs. The horses and dogs came from England; the sheep were in transit from Australia to Nairobi; and the pigs, which were for slaughter purposes, came from Cape Colony.

Crop Reports for September.

ACCORDING to our reports, the weather conditions in most parts of the Colony during the month of September were good. Several of our correspondents, in fact, consider that last month was the most favourable experienced by farmers for years. The rainfall, as far as most of our reports show, was sufficient.

In several districts ploughing is now in full swing; though on many farms agricultural operations have been delayed owing to the rush to deliver mealies early for export. The indications are that more land will be put under mealies this season on account of the favourable prospects of the newly-organised mealie export trade. Our correspondent at Kambula (Vryheid) estimates that, in his immediate neighbourhood, quite 25 per cent. more land altogether will be brought under cultivation this year than last; and he considers that the acreage under potatoes will be 50 per cent. greater than last year. He adds that fertilizers are being more extensively used in his district than hitherto.

This year appears to be a good one for fruit. The indications of good prospects contained in the August reports are strengthened by the September reports, a large number of our correspondents commenting upon the promise of a good crop.

There is not much to note concerning the wattle bark conditions; except to say that, according to our Wartburg correspondent, a lot of new ground is being broken up in his district for wattle-growing.

The forage and wheat crops appear to be doing well; and the prospects of the early mealie crop in many districts are reported to be good.

The apparent change for the better in the live stock market alluded to in our last issue is more evident from the reports for September. Our Pinetown, Mid-Illovo, Creighton, Dingley Dell, Wartburg, Colenso, Winter-ton, and Newcastle correspondents report more or less favourably upon the conditions in their respective districts. That the lambing season is an excellent one in most districts of the Colony is undoubted; several of our correspondents consider it a record season. Prices of eggs and poultry show, on the whole, a slight improvement upon those of the previous month, though the upward tendency is more noticeable in the prices of poultry than in those of eggs. Prices for milk and butter remain, generally speaking, good.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg and other South African markets during the month of September-October, have averaged as follows:—

NATAL.

PIETERMARITZBURG.

The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Donkeys, £8 8s; fowls, 2s; ducks, 2s 6d; turkeys: cocks 10s, hens 6s; guinea-fowls, 2s 9d; rabbits, 1s 6d.

Animal Produce.—Bacon, 7d per lb; pork, 5d per lb; ham, 9d per lb; eggs, 10d per dozen; butter, 1s 4d per lb; cheese, 9d per lb; honey, 6d per lb; hides, 7d per lb; lard, 8d per lb; beef, 5d per lb; mutton, 7d per lb.

Vegetable Produce.—Buckwheat, 15s per muid; beans, 21s per muid; earth nuts, 10s 6d per muid; Japanese millet (grain), 5s per 100 lbs; Kafir corn, 11s 6d per muid; mealies, 9s per muid; hay, 20s per ton; onions, 12s per 100 lbs; peas, 21s per 100 lbs; potatoes, 5s per 100 lbs; sunflower seeds, 6s 6d per 100 lbs; sweet potatoes, 2s 6d per muid; amadumbe, 4s 6d per muid; barley, £1 10s per ton; oats, £1 per ton; bananas, 1s 6d per 100; oranges, 2s per 100; naartjes, 2s per 100; lemons, 1s per 100.

DURBAN.

The Market Master reports the following average prices realised during the month ended 12th October:—

Live Stock.—Sucking pigs, 5s 6d; fowls, 2s 1d; ducks, 3s; guinea-fowls, 3s 3d; rabbits, 1s 3d.

Animal Produce.—Butter, 1s 3d per lb; eggs, 1s per dozen; pork, 4d per lb.

Vegetable Produce.—Amadumbe, 3s per muid; Kafir corn, 10s per muid; mealies, 8s 3d per muid; earth nuts, 12s 6d per muid; potatoes, 8s per muid; sweet potatoes, 2s 6d per muid; turnips, £3 per ton.

TRANSVAAAL.

JOHANNESBURG.

Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, representing the farmers' co-operative associations of the Cape Colony, has furnished the following prices realised on the Johannesburg market during the week ended 17th October:—

Market Prices.

Live Stock.—Oxen: slaughter £9 to £16 10s each, dressed £2 to £2 4s per 100 lb; cows (milk), £15 to £35; sheep: slaughter lambs 17s 6d to 23s each, dressed 5d to 5½d per lb; pigs, 3½d per lb live weight; donkeys, £6 to £9; mules, £15 to £22; fowls, 2s to 3s; ducks, 2s 6d to 3s 6d; geese, 5s 6d to 6s; turkeys: cocks 9s to 12s 6d, hens 5s to 7s.

Animal Produce.—Butter, 1s per lb; eggs: new laid 1s 6d to 1s 9d, fresh 1s to 1s 3d, per dozen.

Vegetable Produce.—Bran, 7s to 10s per bag of 100 lbs net; beans (dry) 10s to £2 4s per bag of 200 lbs net; chaff, 3s to 3s 6d per 100 lbs; forage, 3s 6d to 7s per 100 lbs; Kafir corn, 11s to 13s per bag of 200 lbs net; lucerne, dry, 5s 6d to 6s 3d per 100 lbs; manna, 2s 6d to 3s per 100 lbs; mealies, 8s to 8s 9d per bag of 200 lbs net; onions, 18s to £1 2s per bag of 120 lbs net; oats (seed), 8s to 11s per bag of 130 lbs net; peas (dry), 16s to £1 5s per bag of 200 lbs net; potatoes, per bag of 160 lbs net: 10s to 18s, medium, 6s to 9s 6d; sweet potatoes, 5s to 9s per bag of 120 lbs net; turnips, 2s to 3s per bag; bananas, 1s 6d to 3s per 100; lemons, 2s 6d to 4s per 100; naartjes, 3s to 5s per 100; oranges, 3s to 7s per 100; pineapples, 2s to 3s per dozen.

Notes.

Mr. Webb also contributes the following notes on the Johannesburg produce and live stock market:—

Live Stock.—Prime beef is in good demand at highest rates with a somewhat limited supply. Mutton is cheaper in every class, and tip-top

quality is sold to-day at prices that would have been laughed at a few months back. It daily becomes more apparent that the country is growing sufficient produce and stock to supply its own wants, or at any rate nearly so, and, unless some oversea outlet is found for the surplus, and discouragement given to oversea importations, the South African producer will have to be satisfied with prices even a great deal lower than he is getting to-day.

Poultry.—A considerable trade continues in this department of the morning market, and suppliers should be more satisfied with to-day's prices. Farmers should watch this section from now onwards, and take advantage of improved values as Christmas approaches.

Butter.—Fresh farm butter is beginning to make an appearance, and a big local demand exists for this quality. Good prices can be obtained, and even the smallest consignments can be placed to advantage. Correspondence in this section is particularly invited.

Eggs.—Fresh eggs are still coming forward in large quantities, and, in the absence of the imported article, prices remain firm at rates quoted. New laid eggs are improving in price.

Mealies.—Prices are steady at current quotations, and fair parcels change hands daily. Hickory Kings are in great request and fetch top prices, consignments being placed out of hand without difficulty and thus saving market dues, cartage, etc.

Kafir Corn of good quality, both red and white, finds a ready sale, and larger quantities can be absorbed.

Manna.—This article always finds a ready market, even if of very poor quality, and it should pay farmers to grow larger quantities. The seed can be purchased locally at a moderate price.

Potatoes.—It has been a bad year for potato growers, and prices still remain unremunerative. Hundreds of bags of old potatoes come on to the market daily, and new season's are beginning to arrive to make values still worse for old stocks. New season's are bought up quickly at excellent prices, and consignments of these can be forwarded.

Peas and Beans are very firm at highest rates for best sorts, and prices show an upward tendency. More Sugar and Rangoon beans should be grown for this market, instead of the many Kafir varieties now sent forward. I should always be pleased to post samples of the sorts that are mostly in demand.

Forage.—Average values are much lower for this article, and as the new season's crops from the Western Transvaal are arriving in larger quantities (and of excellent quality) prices will probably weaken still further.

Lucerne.—Dry pressed is suffering from competition with cheap oat-hay, and, as the Colonial crop is almost due, I anticipate a considerable fall in values before Christmas. Farmers should remember that in this

market green-coloured lucerne is always preferred to brown-coloured, and fetches a higher price. In articles such as lucerne, oathay, etc., it is advisable to forward in short trucks in preference to bogies, as being more easily regulated at this end in case of an adverse market.

Fruit.—This section is poorly supplied, and much better financial results would attend consignments if senders would study the peculiarities of this market. The public here likes its fruit large and of good appearance, irrespective of quality. Apart from this fact certain details of packing, etc., should be adhered to in order to get the best prices. Correspondents can obtain full particulars upon application.

CAPE COLONY.

The following information has been compiled from the last available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 12th October), appearing in the *Cape Times*:—

Live Stock.—Prime slaughter oxen, 37s 6d to 38s 6d per 100 lbs dressed weight, Maitland; sheep, from 52 lbs to 56 lbs dressed weight, 21s to 22s 6d; fowls: small 1s 3d to 1s 6d, medium 1s 6d to 2s, large 2s 3d to 3s 3d; ducks, 2s 11d to 3s 6d each; turkeys: hens 4s to 6s 6d, cocks 5s 9d to 10s 6d; geese, 3s 6d to 4s 9d.

Animal Produce.—Colonial butter, best: 1s 4½d wholesale, 1s 9d retail; Colonial Cheddar cheese, 9d to 10½d per lb delivered Capetown; Colonial Camembert cheese, 9s per dozen; Colonial National cream cheese, 4s 6d per dozen; eggs: fresh 8s to 8s 6d per 100, not guaranteed 7s to 7s 6d per 100; ostrich eggs, 9d to 1s each.

Vegetable Produce.—During the week under review the Australian wheat market continued to advance steadily and local prices rose in sympathy. Inquiries for new season's crops of lucerne were numerous, and the prices for this hay must consequently come down. Sales in this item have been very small for some time, owing partly to the low prices quoted for oathay. Rye and mealies advanced slightly, while bran receded a few pence. The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 lb.—Caledon 1st, 19s 9d to 20s; Malmesbury, 21s to 21s 6d; Moorreesburg, 21s to 21s 6d; Porterville-road, 21s to 21s 9d.

Colonial oats, per 150 lb.—Caledon 1st, 5s 9d to 6s; 2nds, 5s 3d to 5s 6d; Moorreesburg, 6s 6d to 6s 9d; Malmesbury, 6s 6d to 6s 9d; Main Line, 7s 3d to 7s 6d.

Colonial barley, per 150 lb.—Moorreesburg, 8s to 8s 6d; Main Line, 8s 3d to 8s 9d; Caledon, 7s 9d to 8s.

Colonial rye, per 200 lb.—Country stations, 17s 6d to 17s 9d; ex Stores, Capetown, 17s 9d to 18s.

Kafir corn, per 200 lb.—Red, 12s 9d to 13s; white, 12s 6d to 12s 9d., *ex* Stores, Capetown.

Bran, per 100 lb.—5s 3d to 5s 6d, *ex* Stores, Capetown.

Mealies, per 200 lb, delivered Capetown.—Natal yellows, 11s 6d to 11s 9d; O.R.C. small yellows, 13s 6d to 13s 9d; Natal white coast, 11s 9d to 12s; Eastern Province Germans, 12s 9d to 13s; Eastern Province mixed, 11s 6d to 11s 9d.

Forage, per 100 lb.—Colonial lucerne hay: 5s to 5s 3d. Colonial oathay, 4s to 4s 1d, main line stations; 3s 6d to 3s 8d, Moorreesburg and Malmesbury. Colonial fodder: 5s 6d to 5s 9d *ex* Stores, Capetown. Colonial compressed chaff: 1s 9d to 1s 10d; main line stations, 1s 7d to 1s 8d, Moorreesburg and Malmesbury.

Vegetables and fruit.—Potatoes: 1st quality 4s 6d to 6s 6d per bag, 2nd quality 3s 6d per bag, new 8s 6d to 10s 6d per bag; sweet potatoes, 4s to 6s 6d per bag; onions: new season's 4s per 100 bunches, good quality 16s to 20s per bag, 2nd quality 8s to 12s 6d per bag; green peas (fresh), 1s 6d to 3s per bag; beans (Natal and sugar), 35s to 40s per bag; bananas: choicest 22s to 24s per case of 800 to 1,000; 2nd, 14s to 20s per case; pineapples, E.P., 1s 9d to 2s 6d per dozen; oranges: small 2s 6d to 3s 6d per 100, medium 4s to 6s per 100, large 6s 6d to 13s per 100; naartjes, 2s to 9s per 100; limes, 2s to 4s per 100 lbs.

ORANGE RIVER COLONY.

BLOEMFONTEIN.

The Bloemfontein *Weekly Post* of the 15th October publishes the following prices realised on the Bloemfontein market:—

Live Stock and Animal Produce.—Fowls, 2s to 2s 6d; fowls, dressed, 2s 3d to 3s; ducks, 2s 6d to 3s; geese, 5s to 6s; turkeys, 5s to 10s; eggs, 1s to 1s 3d per dozen; butter, 1s to 2s lb; mutton, per hind quarter, 4s 6d to 5s 6d; mutton, per fore quarter, 3s to 4s; pork, 4d to 6d per lb; beef, 4d to 6d per lb.

KIMBERLEY.

Messrs. Jas. Lawrence & Co., Ltd., P.O. Box 301, Kimberley, supply the following report dated the 18th October:—

Since our last report there has been a considerable advance in imported and Colonial meals, and there is no likelihood of prices receding before the new crop is reaped. Mealies are slightly firmer. Good white Kafir corn inquired for. Onions have declined in value owing to arrival of several consignments. Potatoes are a glut in the market; prices very low except for first-class samples. Eggs easier. Fresh butter in demand. Fat poultry finds ready sale. Good supply of fresh vegetables. Both oranges and naartjes are easier. Prime slaughter oxen in demand. Large stocks of small stock held locally. No demand for pigs.

Live Stock.—Oxen (good) prime, 600 lbs upwards, £10 to £15; cows (good), 450 lbs upwards, £5 10s to £8; calves, 5½d per lb dead weight; pigs, 100 lbs (clean), 3d to 3½d per lb live weight; lambs, 30 lbs, 13s to 14s 6d; hamels, 40 lbs, to 45 lbs, 16s to 20s; Cape sheep (good), 16s to 20s; rapaters, 16s to 20s; oxen, trek, £7 to £8; riding horses, £10 10s to £27 10s; draught horses, £10 to £25; mares, £10 to £25; fowls, 1s 6d to 2s 9d; ducks, 2s 9d to 3s 6d; turkeys, 7s to 15s.

Animal Produce.—Butter fresh 1s 2d to 1s 6d per lb, second quality 10d to 1s 1d per lb; eggs, 9d to 11d per dozen; hams and bacon, 5d to 8d per lb.

Vegetable Produce.—Bran, 7s to 7s 6d per bag of 100 lbs; barley, 7s 6d to 12s 6d per bag of 163 lbs; forage: good 6s to 6s 6d, inferior 3s 6d to 4s 6d per 100 lbs; Kafir corn: South African mixed 8s 6d to 10s 6d, white 10s 6d to 14s; mealies: Colonial yellow 8s 6d to 10s per 203 lbs, Colonial white (hard) 8s to 9s 6d per 203 lbs, mixed 7s to 9s per 203 lbs; mealie meal: O.R.C. 9s 6d to 10s 6d per 183 lbs, white 10s to 11s 6d per 183 lbs; Cape oats, 10s 6d to 11s 6d per bag of 150 lbs; lucerne hay, 4s 6d to 5s per 100 lbs; wheat, 17s to 20s per bag of 203 lbs; beans: sugar 30s to 40s per bag of 203 lbs, Kafir 10s to 13s per bag of 203 lbs; chaff: Colonial 6s 6d to 12s 6d per bale, Colonial pressed 3s 3d to 4s per 100 lbs; Boer meal (Col.): unsifted 22s to 23s 6d, sifted 25s to 27s; onions, 18s to 25s per bag of 120 lbs; potatoes, 3s to 8s; tobacco: good 4d to 7d, inferior 2d per lb; oranges, 3s 6d to 6s per 100; lemons, 2s to 3s 6d per 100; naartjes, 2s to 4s per 100; pineapples, 1s 6d to 2s 6d per dozen; dried peaches, 2d to 6d per lb; dried apricots, 2d to 5d per lb.

WOOL, MOHAIR, ETC.

Messrs W. Dunn & Co., Durban, in the course of their report on wool, mohair, etc., give the following prices:—

WOOL.

Newcastle District.

Long fine clean, 12 months, 8½d to 9d; ordinary ditto, 7½d to 7½d; fine clean, 9 months, 8d to 8½d; short ditto, 7½d to 7½d; heavy faulty, 5½d to 6d.

Vryheid District.

Superior long line, 12 months, 7½d to 8½d; good long ditto, 7d to 7½d; ordinary ditto, 6½d to 6½d; poorer lots, 5½d to 6d.

Harrismith and Vrede District.

Good light, 12 months, 7½d to 8½d; average length ditto, 6½d to 7d; short clean, 6-9 months, 6½d to 7d; heavy inferior, 12 months, 6d to 6½d; earthy heavy, 5½d to 5½d; average fair ditto, 6d to 6½d.

NATIVE WOOLS.

Basutoland, 6½d to 7¼d; E. Griqualand, 7d to 8¼d.

MOHAIR.

The market for this staple remains quiet, and the only business done this week was in Long Fine Blue mohair, which was sold at prices ranging from 12½d to 13d. Short mixed is still neglected.

We quote: Superior long sorted O.R.C. and Transvaal, 13d to 13½d; fair average, 11½d to 12d; mixed, 10½d to 11d; coloured and kempy, 7d to 8½d.

HIDES AND SKINS.

Hides.—Superior sun dried, 7d to 7½d; damaged, 6d to 6½d; salted, 6½d to 6¾d.

Sheep Skins.—Sound skins are quoted at 6½d to 7d; damaged, 4d; average, 5½d to 6d; mixed parcels; 4½d to 5½d.

Goat Skins.—Sound skins, 5d to 6d; average, 4d to 5d.

Angora Skins.—Sound, 5d to 6d; damaged, 2½d.

The Oversea Maize Market.

THE POSITION IN SEPTEMBER.

THE following information regarding the oversea maize market has been compiled from *Beerbohm's Evening Corn Trade List*:—

WEEK ENDED SEPTEMBER 6TH.

During this week there was a further decided advance of 9d. to 1s. per quarter in maize values, with an active demand. The sudden cessation of the Roumanian shipments, and the very unfavourable crop reports from that country and from South Russia, as well as the poor prospects in America, led to quite an active speculative demand, and La Plata for October shipment made 25s. 9d., whilst Novorossisk steamer, October, realised 26s. 6d. per 492 lb.

The latest reports to hand from Roumania described the condition of the crop as very bad, and it was considered probable that it is only the unsatisfactory political conditions of the country which prevent the Government from prohibiting exports, the same being the case in Bulgaria. It is very likely, therefore, that, with the very moderate supplies to be

expected from Argentina, the world's shipments of maize may now remain quite moderate, or even small, until the new American crop begins to move next January. The present outlook for that crop is far from favourable, and cheap sellers of new crop for January shipment, usually so numerous at this period, with a good crop promise, are conspicuous by their absence. At this date last year, parcels of new crop for London could have been bought at 19s. 9d. c.i.f.

The maize market was very slow to move during the

WEEK ENDED SEPTEMBER 13TH,

notwithstanding very moderate shipments and very unfavourable crop reports from Roumania and Russia, and an officially indicated shortage in the American crop of 50 million quarters compared with last year, and of 24 million quarters compared with 1905. Recent supplies in the United Kingdom were very large, amounting to over 300,000 quarters per week for ten weeks; and as prices somewhat unexpectedly reached a comparatively high level, consumers are disposed to use up their accumulated stocks. With the probability, however, of short crops in both America and Roumania this year, and with what seems likely to prove a dear season for wheat, the possibilities are greatly in favour of a decidedly high level of prices also for maize.

After some slight giving way in prices, the market during the

WEEK ENDED SEPTEMBER 20TH

again became firm, with a better demand, and prices were rather higher on the week: 25s. 6d. was paid for La Plata steamer afloat, and 25s. 9d. for October-November shipment, whilst 25s. 9d. per 480 lbs. was made for a steamer of Dan.-Gal.-Fox, 15th September-October shipment. Thanks to fairly large shipments from Argentine and Russia, the exports to Europe maintained a good rate; for five weeks the shipments had averaged 280,000 quarters per week for the United Kingdom and 160,000 quarters for the Continent, against 195,000 quarters and 210,000 quarters respectively in the corresponding weeks last year. Roumania, however, has practically ceased to offer, and very little will be forthcoming from America until next year, so that for some time to come the Argentine will be the chief source of supply. Since the beginning of the present Argentina season (May 1st) the La Plata shipments show a falling off compared with last year of over 50 per cent., and during the remainder of the season, viz., until next May, there will probably be an even greater deficiency compared with last year, because the high prices have naturally attracted supplies earlier than otherwise would have been the case. Last year, in the 33 weeks from September 19th to April 30th, the La Plata shipments averaged 150,000 qrs. per week; in the previous year they were 100,000 qrs., and in 1904 they reached 175,000 qrs. This season they will probably not reach 50,000 qrs. weekly for this period.

"With regard to the Roumanian crop," the *Corn Trade List* remarks, "the reports remain very unfavourable, and are almost equally so from America, as is evidenced by the fact that Iowa, the leading maize State last year with 375,000,000 bushels, expects this year to reap little more than half that quantity. The *Cincinnati Price Current* also reports that much of the maize crop is still green, and dry, warm weather is essential for maturing the crop before the frost arrives. It seems to us, therefore, that indications point to a season of high prices for maize, as well as of wheat. Meanwhile, the recent liberal supplies in the United Kingdom will probably tend to keep the market in check."

There was a decided improvement in maize values during the

WEEK ENDED SEPTEMBER 27TH,

with a good demand, notwithstanding liberal shipments to United Kingdom. The lack of offers for shipment from Roumania, in which country it is now definitely clear that the crop is more or less seriously a failure, and the growing feeling that the American crop will likewise prove to be a short one this year, have combined to create a more general desire to buy maize for forward delivery, and up to 26s. 9d. has been paid for La Plata for October-November shipment, and 27s. for a handy steamer early October shipment, whilst for Novorossisk maize, 15th October-November shipment, 27s. 1½d. has been paid.

"The possibilities of short maize supplies in the future are becoming, it would seem, more clearly defined," the *List* says: "the Argentine Republic is now practically the main source of supply, and that source may very shortly dry up. The season's shipments are, indeed, already far larger than was expected, according to the official estimate of the crop, and it is quite probable that the surplus remaining to be exported from now to next April does not reach 1,500,000qrs. as compared with 5,000,000qrs. at this date last year. Roumania has shipped during the past 12 months about 6,500,000qrs. out of a supposed surplus of 9 million quarters, and Russia 3½ million quarters out of an estimated surplus of 5 million quarters. Fair stocks of old corn therefore doubtless remain in Roumania and South Russia, but the new crop in Roumania presents the possibility of being so short this year that holders will be loth to part with what remains of their old crop. We are, indeed, assured that it is only the fear of creating a financial crisis in the country which prevents the Roumanian Government from prohibiting exports."

The condition of the American crop has, however, been attracting much attention. The September report of the Washington Bureau indicated a yield of 2,500 million bushels, against 2,900 millions last year, but subsequent conditions have been decidedly unfavourable for the maturing of the crop, and there is no doubt, according to the *Cincinnati Price Current* and other authorities, that damage by frost resulted during

the week under review. How serious this damage may be remains to be seen, but the crop is peculiarly susceptible this season, being so late.

STATISTICS.

The probable crops in South Eastern Europe compare with actual returns last year as follows, with a similar comparison for the United States:—

			1907.—Qrs.	1906.—Qrs.
Roumania	...	...	7,500,000	15 750,000
Bulgaria	...	...	2,000 000	2 000,000
Servia...	...	...	2 750,000	3 250 000
Hungary	...	...	20,000,000	19,000,000
Russia	...	...	5,970,000	8,250,000
Total	...	...	38,220,000	48 250,000
America	...	...	290,000,000	340,000,000
Grand Total...	...	...	328,220,000	388 250,000

THE AMERICAN MAIZE CROP.

In America, according to the Washington Bureau's report for September 1, the average condition was 80.2, against 90.2 last year, and there is little doubt, judging from the subsequent cabled reports, that the condition has further declined since September 1. The season, has, indeed, been a distinctly unfavourable one, both for maize and oats, the latter showing an average condition of 65.5, against 81.9 last year, and 90.3 in 1905. The following is a comparison of the Bureau's returns since 1899:—

Condition.					Acreage.	Yield—Bush.
	July	Aug.	Sept.	Oct		
1907 ...	80.2	82.8	80.2		*98,099 000	*2 500,000 000
1906 ...	87.5	88.1	90.2	90.1	96,738,000	2 927 416,000
1905 ...	87.3	89.0	89.5	89.2	94 011,000	2,707 994,900
1904 ...	86.4	87.3	84.6	83.9	92 231 000	2 467,481,000
1903 ...	79.4	78.7	80.1	80.8	88,092,000	2,244,000,000
1902 ...	87.5	86.5	84.3	79.6	94 043,000	2,523 000,000
1901 ...	81.3	84.0	81.7	82.1	91 350 000	1,522,519,000
1900 ...	89.5	87.5	80.6	78.2	*90 000,000	*2,250,000,000
1899 ...	86.5	89.9	85.2	82.7	94 916,000	2 666,000,000

* Estimated.

THE WORLD'S MAIZE CROP.

The following statement gives the actual world's production of maize for the years 1902-1906, with *Beerbohm's* estimate for 1907:—

	Quarters.
1907 (Estimated)	385,000,000
1906 (Actual)	440,000,000
1905	400,000,000
1904	356,000,000
1903	357,000,000
1902	377,000,000

The world's maize consumption is, of course, a varying quantity, which adapts itself to price and the quantity available. During the past season the consumption has been enormous; it remains to be seen whether the relatively high prices, which appear likely to prevail during the coming season will seriously affect the rate of consumption.

The general statistical position of maize on the 27th September was as follows:—

			1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	..	...	965,000	930,000	1,120,000
“ “ Cont.	...	...	520,000	870,000	925,000
Imports into U.K. for the 38 weeks ending Sept 27	...	...	8,914,700	8,160,300	8,118,800
Visible supply in U.S. (<i>Bradstreet's</i>)	...	...	994,300	878,400	1,086,900
<hr/>					
American crop	...	...	1906-7 340,000,000	1905-6 316,000,000	1904-5 285,000,000
New York, Spot	...	...	1907. Nom.	1906. 56½c	1905 59½c
Mark Lane, La Plata landed	...	...	26½	20½	23½

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

		1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
		Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America ...	...	3,244,000	3,870,000	3,401,000	5,448,000	4,009,000	5,113,000
Argentina ...	...	2,644,000	1,502,000	4,420,000	3,635,000	5,048,000	2,797,000
Russia ...	...	1,299,000	1,889,000	170,000	249,000	212,000	476,000
Danube, etc.	...	2,013,000	3,524,000	424,000	1,123,000	126,000	139,000
Total	...	9,200,000	10,785,000	8,415,000	10,455,000	9,395,000	8,525,000

* Includes shipments for orders.

NATAL MEALIE EXPORT.

Discussing the Natal maize export trade, in a recent issue, *South Africa* said:—

“The consignments of Natal mealies which have recently come to hand have met an active market, as much as 26s., and in some cases 26s. 6d. per quarter having been realised. A large quantity has reached Hamburg, Antwerp, and Rotterdam during the last few days to be used for distilling purposes, and good business is stated to have been done.”

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of September, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			Tons. Cwt
	E.	N.	I.	E.	N.	I.	E.	N.	I.	
Natal Navigation ..	34	84	253	22	317	232	—	—	—	24,583 17
Elandslaagte ..	18	25	272	18	180	450	1	2	3	15,542 0
Durban Navigation ..	26	182	60	10	356	63	—	—	—	14,424 0
Glencoe, Natal ..	13	70	14	11	451	81	—	—	—	13,974 6
South African ..	10	13	92	11	480	49	5	24	47	13,034 5
Dundee Coal Co. ..	13	11	223	11	34	350	6	8	15	12,886 6
Natal Cambrian ..	13	44	167	9	309	90	3	4	2	11,563 16
St. George's ..	17	49	124	12	185	146	4	13	—	11,080 0
Newcastle ..	9	40	26	7	262	6	3	6	—	6,034 6
Ramsay ..	2	14	42	4	140	80	2	5	8	3,003 0
Natal Steam Coal Co. ..	1	47	4	2	146	2	1	4	1	3,043 19
Central ..	4	68	10	6	234	11	1	4	—	2,962 0
West Lennoxton ..	5	2	62	2	26	106	1	1	—	2,789 0
Talana (Natal) ..	3	16	21	3	30	48	1	2	1	1,864 12
Vryheid ..	2	9	—	2	5	—	—	—	—	42 0
Vaalbank ..	—	—	—	1	4	—	1	4	—	4 0
Dumbi Mountains ..	1	1	—	—	—	—	—	—	—	2 0
Totals ..	171	715	1,375	131	3,109	1,764	29	77	77	137,443 7
Corresponding month, '06	156	730	1,260	122	2,497	1,565	56	233	249	99,014 17

* Cost charged to Capital Account.

† Includes August Return.

Maritzburg,
8th October, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of September, 1907 :—

	Tons.	Gwt
Bunker Coal* ...	56,518	19
Exported to :—		
East London ...	1,507	1
Algoa Bay ...	268	16
Mossel Bay ...	830	17
Cape Town ...	12,955	10
Mauritius ...	7,281	1
Bombay ...	2,251	13
Beira... ..	59	7
London ...	4	0
Total ...	81,677	4

* Including H.M. Warships.

Custom House, Port Natal,
1st October, 1907.

W. L. HOWE,
for Collector of Customs.

Manures on the Natal Market, Season 1907.

NAME OF MANURE.	PHOSPHORIC ACID.										Estimated Total Value of Manure per Ton (2,000 lbs.)	Price asked per Ton of 2,000 lbs. f.o.r. Durban.		
	NITROGEN.		Water Soluble.		Citrate Soluble.		Citrate Insoluble.		TOTAL.				POTASH.	
			Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.			Per Cent.	Value in One Ton of Manure.
<i>Nitrogenous:</i> Nitrate of Soda do.	16.02 15.51	12 8 12 5 7	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d. 12 13 8 12 5 7	£ s. d. 12 10 0a 12 4 6b	
<i>Mainly Phosphatic:</i> Superphosphate (Double)	...	...	39.76	11 2 0	2.82	0 11 9	0.34	0 0 11	42.92	11 14 8	...	11 14 8	12 0 6c
Superphosphate (High Grade)	...	...	17.50	4 17 9	1.52	0 6 4	0.22	0 0 7	19.24	5 4 8	...	5 4 8	5 4 6d
Superphosphate (Ordinary)	...	...	13.74	3 16 9	2.05	0 8 7	0.96	0 2 8	16.75	4 8 0	...	4 8 0	...
Bone Flour (Steamed)	1.37	0 15 9	...	...	9.05	1 17 9	23.83	3 5 6	32.88	5 3 3	...	5 19 0	6 0 0a
Bone Ground ... do.	4.05	2 6 7	...	...	4.15	0 17 4	20.41	2 16 1	24.56	3 13 5	...	6 0 0	6 0 0a
Basic Slag ...	3.99	2 5 11	...	...	5.64	1 3 6	17.97	2 9 5	23.61	3 12 11	...	5 18 10	6 4 2f
Potassic: Sulphate of Potash	...	...	...	...	8.65	2 3 3	9.31	1 14 11	17.96	3 18 2	...	3 18 2	3 19 6b
Kainit	...	...	...	...	...	...	...	...	...	...	...	13 8 4	13 10 0a
Complete: Potato ...	2.68	2 1 2	7.52	2 2 0	3.35	0 14 0	2.48	0 6 10	13.35	3 2 10	...	2 19 0	2 17 6b	

NAMES OF SELLERS.—a—South African Fertilizers Co. b—Steel, Murray & Co. c—F. & G. Reiche. d—J. Raw & Co. e—Natal Chemical Syndicate, Ltd. f—H. C. Foss & Co., Ladysmith.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of Sept., 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from July 1st, 1907.	Total for same per'd from July 1st, 1906.	
	Maximum	Minimum					Fall.	Day.			
Observatory ..	75.8	59.6	84.2	54	2.89	13	1.35	11th	3.06	4.39	
Stanger ..	78.7	57.3	91	47	2.97	12	1.52	10th	4.4	4.36	
Verulam ..	83.6	62.5	92	52	3.34	9	1.61	10th	3.59	4.55	
Greytown ..	76.8	47.3	93	37	2.3	10	1.01	19th	2.47	2.90	
Newcastle ..	78.4	49.5	91	40	2.83	6	.82	18th	2.83	3.64	
Ndredwe ..	72.0	58.0	82	50	3.06	8	1.21	11th	3.51	5.72	
Estcourt ..	78.8	43.6	90	36	1.30	5	.55	19th	1.30	2.51	
Mid-Illovo ..	75.1	53.5	83	40	2.91	9	1.34	11th	3.41	5.55	
Buwer ..	—	—	—	—	3.53	14	1.19	10th	3.75	—	
Camperdown ..	80.5	54.2	93	45	1.88	5	.92	10th	2.00	3.92	
Port-Shepstone..	74.9	54.5	84	45	1.62	0	.49	11 h	2.71	5.87	
Richmond ..	76.1	50.5	93	39	3.0	11	1.24	10th	3.50	4.37	
Maritzburg ..	76.9	52.9	95	45	2.63	8	1.21	10th	2.63	3.55	
Howick ..	74.7	47.9	100	33	2.72	6	1.34	10th	3.06	3.79	
Dundee ..	76.6	53.2	88	44	2.93	0	1.0	20th	2.98	2.35	
Weenen Gaol ..	85.4	43.5	99	40	1.74	0	.80	18th	1.74	1.80	
New Hanover ..	77.8	50.2	93	42	3.23	13	1.37	11th	3.32	4.38	
Utrecht ..	83.3	37.7	101	25	1.40	5	.47	29th	1.40	—	
Vryheid ..	—	43.3	—	29	3.38	6	.90	22nd	3.8	2.48	
Nongoma ..	74.9	46.6	104	40	2.32	8	.70	18th	2.82	5.33	
Nqutu ..	74.2	50.3	88	42	1.88	8	.59	18th	1.88	1.65	
Mtunzini ..	81.7	54.8	92	40	4.87	9	2.80	11th	6.79	—	
Hlabisa ..	77.9	58.6	97	53	3.93	6	1.33	19th	4.25	5.05	
Melmoth ..	79.2	54.3	103	46	2.40	12	.72	19th	2.46	3.63	
Ubombo ..	78.4	58.7	85	51	1.87	10	.62	21st	2.02	3.39	
Point ..	—	—	—	—	3.51	12	1.43	1 th	5.83	5.40	
Charlestown ..	71.4	43.4	85	33	1.50	9	.65	19th	1.56	1.49	
Ingwavuma ..	—	—	—	—	1.6	4	.83	18th	1.66	3.56	
Mahlabatini ..	79.3	47.4	100	40	1.90	8	.20	18th	1.90	3.35	
Empangeni ..	77.3	58.9	96	50	3.23	10	.92	10th	3.95	4.77	
Anatikulu ..	80.1	59.3	94	53	1.35	12	.55	10th	2.14	3.91	

Meteorological Observations taken at Private Stations for Month of Sept., 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain-fall in one day.		Total for Year from July 1st, 1907.	Total for same period from July, 1906.	
					Fall.	Day.			
Dalton ..	—	—	2.53	10	0.90	10th	2.69	—	
Bransholme ..	—	—	3.90	9	1.35	18th	4.61	5.11	
Giant's Castle ..	74.8	44	1.57	7	0.83	11th	2.20	—	
Nottingham Road ..	—	—	3.06	8	1.41	10th	3.39	4.49	
Adamshurst (Wm. Adams) ..	93	45	2.04	5	1	10th	2.11	—	
Hilton ..	90	42	2.75	11	1.29	10th	2.98	4.83	
P.M.B. Town Bush Valley ..	—	—	3.03	9	1.13	10th	3.59	5.16	
Cedara-Hill ..	90	40	2.02	7	1.10	10th	2.15	3.96	
„ Vlei ..	95	36	2.17	8	1.10	10th	2.32	3.86	
Winkel Spruit ..	82	51	3.73	9	2.12	10th	5.85	6.05	
Ottawa ..	—	—	2.80	7	1.40	11th	2.8	—	
Mount Edgecombe (Natal Estates) ..	—	—	3.22	10	1.71	1 th	3.84	5.46	
Corubia ..	—	—	3.20	—	—	—	3.82	—	
Milkwood Kraal ..	—	—	2.40	—	—	—	2.91	4.99	
Blackburn ..	—	—	2.91	—	—	—	3.76	4.12	
Sacharine ..	—	—	2.91	—	—	—	3.40	4.78	
Equefa (W. Hawksworth) ..	89	54	2.33	8	0.84	11th	2.91	6.25	
Umzinto, Beneva ..	—	—	2.43	8	0.77	10th	2.76	6.19	
Riet Vlei ..	—	—	1.98	7	0.91	1 th	2.05	—	

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith	Scab	P. Nicholson	Nicholson's Nek
			G. J. McDouling	Waterford
			W. Anderson	Netherby
			Jimze	Rossboom
			Mapelwana	Roodepoort
			W. M. Buys	Ruit Kuil
			F. Colling	Klipdal
			F. T. Hyde	Himsley
			H. O. Hyde	Allen Park
			H. N. Nel	Catharine
			Ingetenga	Roodepoort
			Alabin da	Tijffaar
			J. van de Bosch	Rather Glen
			Mkungeni	Jojoseni
J. R. Cooper	Nkandhla & Nqutu		A. Mbala	Blood River
			Vinuv-e Libuna	Nkandi
			Luhlenia Ka etc.	Magala
			Sotshata Ka	No dweni
			Strineria Ka Yabya	Tlizi Hill
			Liyo Ka Norhayi	Mapaswaneni
			Komana Ka	Siluyela
			Makaskela	
			Hlanganiza Ka Ndi	Nigusini
			Ngeongcoya Ka Pepa	"
			Khisenika	
			Makwangqa	Selutshana
			Legudhla Mni	Nqutu Hill
			Gada eni Chief	Sandheawana
			Makuba Ulife	Haladu
			Menezi Kamaagata	Kwondeka
			Boy Ka Matato	Nqutu Loot
			Peli	Nqutu
			Lerazake Leputza	Mafethling
			Abela Kuzeizili	"
			Nsinango Butelezi	Selutshana
			Sekwata Ngobeze	Nqutu
			Lepondo and others	Hlazagaza
			Mudwo and others	"
			Guzi Ka Mfeka	"
			Lekeniga	"
			Mpitipiti	Sandheawana
			Dak sele	Selutyenn
			Soutomo Ngobeze	Mahgato
			Dabeni Mqubo	Moweni
			Jabez Mbita	Nqutu Town
			Albert Selepe	Magubeni
			Leyarha Sondetzi	Nkandi
			Letuya Mlefo	Nemceni
			Letuza Mlefo	Haladu
			Lunwy za Sondetzi	Nkandi
			Kanyiza Ntombelha	Magogo
			Mishaki Butelzi	Nqutu
			Mbauko Dubenzana	Telesi Hill
			Mhlawafa Mhlolo	Mkanjalo
			Lefabaselepe	Nqutu
S. A. Brown	Underberg		J. A. Stone	
			T. de G. Arbuckle	Kerridge
			B. Phipson	Strathcampbell
			M. Fraser	Winterhoek
			R. C. Gold	Woodend
			J. R. Royston	Greenend
A. B. Koe	Portion of Estcourt		J. van Whye	Silburn
			F. A. Hathorn	Sanguana
			T. Palfman	Slogoma
			J. J. B. Cooke	Estcourt
A. J. Marshall	Dundee		F. R. Moor	Greystones
			R. J. du Bois	Giba
			J. W. de Bruyns	Rooffontein

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—continued.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. J. Marshall ..	Dundee	Scab	C.M. & T.C Vermaak	Paddock & Harriotdale
		"	J. P. Nel ..	Eamsccliffe
		"	A. C. Vermaak ..	Sigtuna
		"	C. J. Pieters ..	Zwaartwater
		"	P. J. Meyer ..	Kilburn
		"	A. Date ..	Kemperweldt
		"	C. P. Cronje ..	Kilburn
E. Varty ..	Western Umvoti ..	"	C. A. Charlwood ..	Craigieburn
J. J. Hodson ..	Ptn of Lion's River	"	R. Spiers ..	Moyeni
		"	W. Willson ..	Thornton House
		"	W. A. Dales ..	Gowrie
		"	G. Woodhouse ..	Halliwe
		"	G. H. Burgmann ..	Boschhoek
R. Mayne ..	Krantzkop ..	Lungsickness	Maqanganse ..	Loots Hoek
		"	Uqupu ..	Myoniezwe's Locat'n
		"	Ndabane ..	"
		"	S. Johnson & Co. ..	Inadie Store
		"	Ndabane ..	Myoniezwe's Locat'n
		"	Natives ..	Myoniezwe's Locat'n
		"	Amosi ..	"
A. H. Ball ..	Weenen	Scab	Vunyo and others..	Elena Berg
		"	Kwinkwe ..	Belle Vue
		"	Tshoboso ..	"
		"	C. Strapp ..	Lilyfontein
		"	T. J. Van Rooyen ..	Belle Vue
		"	L. J. & T. C. Lotter	Waterfall
		"	S. C. Van Rooyen..	Middleburg
		"	A. & M. Lotter ..	Waterfall
		"	C. P. F. Lotter ..	"
		"	D. Huyser ..	Bird Spruit
G. Daniell ..	Vryheid ..	"	J. L. Fourie ..	Scottshoek
		"	Nkanyeze..	Mooiplants
		"	D. Coetzee ..	Doornhoek
		"	Molite ..	Beaufort
		"	Zimbata ..	Nooitgedacht
R. Mayne ..	Eastern Umvoti ..	Lungsickness	Nkabi and others	Loots Hoek
		Scab	F. Mare ..	Speculation
J. Button ..	Portion of Estcourt	"	J. J. Marais ..	Malan Spruit
		"	C. Groom ..	Springvale
E. Parkin on ..	New Hanover ..	"	Ndabeni and Jim ..	Location
A. Hair ..	City and Umgeni ..	"	W. J. Dickens ..	Langer Farm
		"	Umsutu ..	Zwaartkop Location
		"	Lutye ..	"
		"	Ndudane ..	Bishopstowe
D. M. Pfaff ..	Utrecht	"	P. Pretorius ..	Geluk
		"	B. J. J. Human ..	Waltrevreden
J. Stewart ..	Bergville ..	"	H. Jackson ..	Lytton
		"	J. Bester ..	Abergeldie
		"	J. Lawford ..	Mt. Bilda
R. Wingfield Stratford	Newcastle ..	"	G. W. Thomas ..	Kingston
		"	D. Keay ..	Charmwood
		"	J. Havemann ..	Flaklaagte
		"	J. H. Muller ..	Leyden
		"	C. Friend ..	Lilydale
		"	J. van Niekerk ..	Poneroy
		"	J. de Wet ..	Schulshoogte
J. G. Speirs ..	Impendh'e ..	"	Pinda, Vete & Sobnon	Furth
A. Brown ..	Polela	"	Mahlali ..	Stoffetown
		"	F. J. Livingstone ..	Fernbank
		"	H. Cole ..	Cameron
		"	P. J. Yenter ..	Everfair & Springholmes
L. Trenor ..	Harding	Lungsickness	Madunckana ..	Tridale
		"	Yanyan ..	Mloshwa
		Scab	F. C. Young ..	Winterhoek
C. T. Vaughan ..	Paulpietersburg ..	"	G. C. Viljoen ..	Makaske Kop
		"	J. Potgieter ..	"
		"	G. J. Viljoen ..	Rondekoppie
		"	G. J. Combrink ..	Paapkuilvlei
		"	H. J. Potgieter ..	Zuchkraal
B. Klusener ..	Port Shepstone ..	Lungsickness	G. Daddy ..	Sugar Bush Cutting
		"	Mbontshe ..	Isotsha

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
Nseleni Abbott Bros.	Markwa Mountain. Highlands.	J. Raw & Co. . . Genegwen	Umgenti. Polela, Location No. 2

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:—

ON THE 6TH NOVEMBER:

Finchley (Ixopo Division).—Black sow, four white feet.

Karlsruhe (Lower Umzimkulu Division).—Chestnut pony, white face, in low condition.

Middledale (Klip River Division).—(1) Black Kafir goat, ewe, marked swallow tail and half moon on right ear. (2) Black Kafir goat, ewe, no marks.

Mooi River.—Dark chestnut stallion, both hind legs white, white strip down face, 3 years old, no brands. Probable value, £6. Impounded on the 23rd September by Mr. E. Ratsay.

Vryheid.—Blue grey she goat, right ear slit, left ear top cut off; with black kid, no marks, found among Native Infalaza's goats. Owner unknown. Impounded by Natal Police.

ON THE 20TH NOVEMBER:

Acton Homes.—(1) Black mare, 13.3, about four years old, nick out of right ear. (2) Bay two-year-old filly, two white hind feet. (3) Mouse-coloured colt foal.

Creighton.—(1) Black ewe, slit in off-side ear. (2) Black ewe, brown belly, two brown stripes down face, small V-shape slit off-side ear.

Finchley (Ixopo Division).—White pig, hog, black head and neck, stump tail.

Howick.—(1) Running on the farm "Allerthorpe," Dargle Road, and reported by Mr. E. Turner as too wild to be driven to the Pound: bay filly, three years, black points, long mane and tail, indistinct brand on left hip. (2) Running on the farm "Howick Grange," and reported by Mr. Thos. Westray as too wild to be driven to the Howick Pound: wether, half of left ear off and X on left side.

Richmond.—Reported by Mr. J. H. Clark as running on the farm "Delectable Dale," and too wild to be driven to the Pound: black ox, white on belly, inclined to be grey on flanks, upstanding horns, about 7 years old, no brands.

South Coast Junction.—Brown American mare mule, aged, white patch near front leg, branded on near neck V, near rump square in circle and 485 underneath, the 4 of which is reversed.

Umsinga.—(1) Three black and three brown goats, no brands or marks. Probable value, 30s. (2) Three black Kafir sheep (ewes) and one lamb.

CHANGES.

After the 31st October the Pound at Impendhle will be abolished, Mr. J. W. Brooke having resigned his appointment as keeper thereof. A Pound has been established at Hilton Road, with Mr. John Norman Pechey as keeper.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	...	1½d. each.
Pigs...	...	...	3d. "
Chilling and Freezing Beef,	1st week	...	1s. 3d. per qr.
"	"	...	2nd " " 1s. "
"	Remaining weeks	...	9d. "
Sheep "	per week	...	3d. "
Pigs	...	...	6d. "

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	...	4s. each (including abattoir fee).
Sheep	...	...	6d. "
Pigs	...	...	1s. " up to 200 lbs.
"	...	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	...	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

Cows Wanted.

WANTED urgently, cows just calved or due to calve. Old animals suitable; any breed.

Apply—P.O. Box 282,
Pietermaritzburg.

Seeds for Distribution.

SEEDS of the following have been secured for distribution to farmers at cost price :—Co ton, Sugar Beet, Tobacco, Rice, Lupins and Field Peas, Italian and Perennial Rye Grass, Paspalum and Cocksfoot. Varieties and prices upon application to the Farm Manager, O.X.F., Cedara.

E. R. SAWER,
Director, Experiment Stations.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions: - Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith R. 2; Babanango, O. 2.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustani, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

No. 102.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer: W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F. N. Meyer. Hon. Sec.: J. Baker. Committee: H. Baker, J. Gavin, J. W. Harvey, J.P., W. B. Turner, H. H. Hutton, C. Baker, H. E. Meyer.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. W. ysaill, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee, W. R. Quesled, A. Grace, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Boehmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schaefermann. Hon. Sec. and Treasurer: Frank J. Volek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T. Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: J. Campbell. Vice-President: A. W. Smallie. Hon. Secretary and Treasurer: R. J. Hearn. Committee: G. Queddon, T. P. Smith, W. A. Helmer, Thos. Brookes, N. Glutz, Wm. Craig, W. R. Quesled, J. A. Brookes, W. T. Heslop, Thos. Dewar, F. Turton, W. H. Tatham, A. E. Norman, D. P. Campbell.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, F. E. Peto, G. Malcolm. Hon. Sec. and Treasurer: G. Palframan, Watermead, Polela. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Yard Steward: H. Brown. Auditors: T. G. Dearlove and T. E. Marriott.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos. Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harris, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: G. C. Ways. Hon. Ass. Sec.: A. G. Harris. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo

Hon. Secretary and Treasurer : Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers Union : President and James Foster. Committee : F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis, Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester, J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt. M. Landsberg. Vice-President: P. R. Vermaak. Hon. Sec. and Treasurer: Dr. L. L. Proksch. Committee: C. J. van Rooyen (Albany), C. J. van Rooyen (Wonderfontein), Philip Nel, J. A. G. Mare, L. M. G. van Rooyen, J. C. Martens.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F. van de Waal. Vice-President: F. G. King. Secretary and Treasurer: H. L. Frances. Auditor: A. D. Buchanan. Committee: R. P. Summerringill, F. W. Holmes, J. P. Wepenaar, J. J. Harding, Max Cameron.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut. Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D. C. Aiken, J.P. Vice-Presidents: H. Albers and C. H. Mitchell, J.P. Hon. Secretary and Treasurer: W. J. Plows. Committee: C. Manning, J. W. Aiken, W. G. Camp, T. F. Godwin, J. Hutton, H. Norden and A. Borchard. Hon. Secretary, Show Committee: J. W. Aiken. Show Committee: A. E. Collison, A. Borchard, F. Knoop, A. Ringo, H. F. Voigts, J. Hutton, C. Manning, A. J. Lugg and H. Albers. Hon. Auditor: J. W. Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R. Garland; Vice-President: C. B. Lloyd; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: H. B. Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer: C. A. Selling. Committee: Otto Rottecher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottecher, C. H. Tilbrook, Rev. H. Rottecher (Hon. Life Member).

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NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

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C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Mereis, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfortenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann, H. Wortmann, Secretary: Paul Vietzen, P.O. Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P. Vice-President: J. King, J.P. Auditor: A. Mengens. Secretary and Treasurer: C. J. King, Nottingham Road.

PIETERMARITZBURGSCH BOEREN VEREENIGING.—President: D. P. Boshoff; Secretary: E. G. Jansen, 313, Loop Street, Maritzburg.

RICHMOND AGRICULTURAL SOCIETY—President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom McCrystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Plett and E. J. B. Hosking.

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SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P. R. Botha (J.'s son). Vice-President: J. M. Handley. Secretary and Treasurer: G. E. Cadle (Box 6, Greytown). Auditor: J. M. Nel. Committee: W. J. Slatter, J. G. Nel, H. F. Torlage, R. J. Landsberg, A. Newmarch, P. H. van Rooyen, A. F. Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Kloppe, B. C. Hattings, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

UTRECHT BOEREN VEREENIGING.—President: D. J. A. van der Spuy; Secretary: G. J. Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut. Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger).

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart; Vice-Presidents: R. Garland, R. H. Ralfe, F. I. de Waal; Hon. Treasurer: F. C. Schiever; Hon. Secretary: E. Catherley; Auditor: S. Wolff; Executive Committee: Hon. H. D. Winter M.L.A., J. W. Moor, M.L.A., D. W. Mackay, T. H. Hindle and E. L. Estrange; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C. J. Offord, G. W. Linfoot, T. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortlepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Purchase of Tree Seeds.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Forester, Cedara.

E. R. SAWER,
Director, Experiment Stations.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

24th September, 1907

W. A. DEANE,
Minister of Agriculture.

Steam Ploughs.

APPLICATIONS are invited for the services in the various districts of the Colony of the Steam Ploughs recently ordered by the Government.

Applicants should state clearly the position of their farms, and the total acreage required to be ploughed.

The charges will, for the present, be at the rate of, approximately, 10s. an acre in the Midland and Upland Districts of the Colony, and 15s. an acre in the Coast Districts; but the Government reserves to itself the right to vary these charges later on when experience has been gained as to the actual cost of working.

Preference will be given to those districts affected by East Coast Fever, and, again, to those from which the greatest number of applications are received.

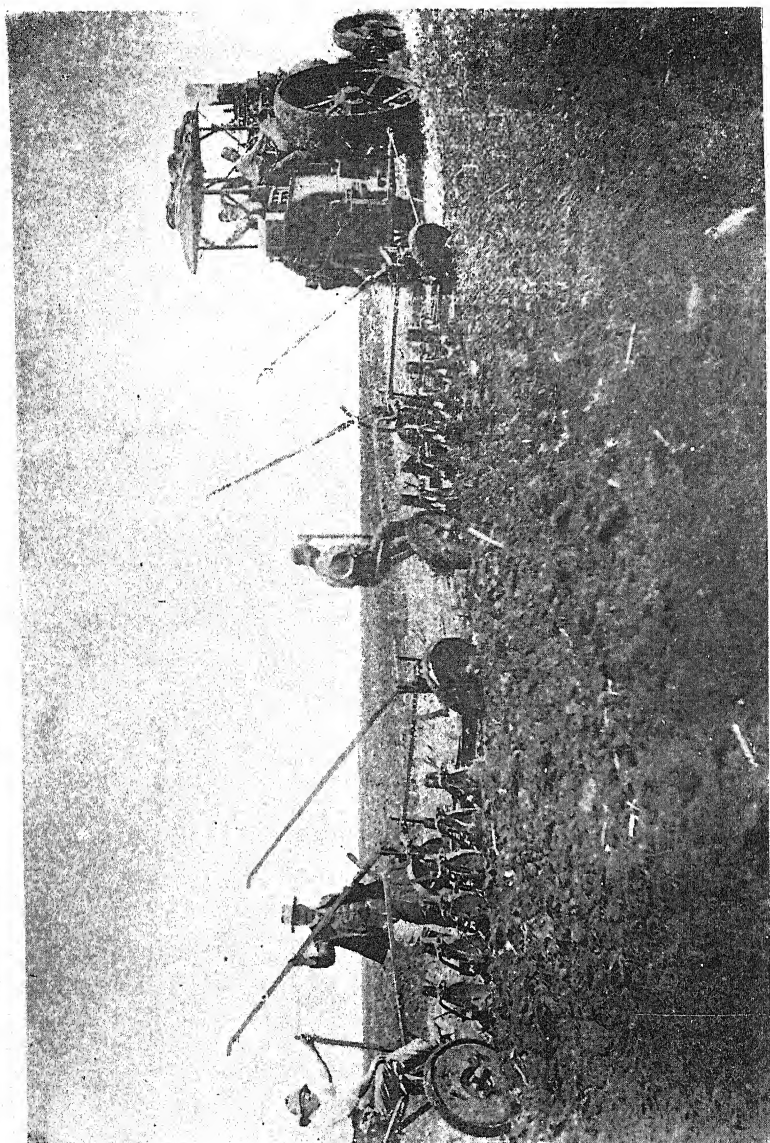
Applicants will be advised, as soon as possible after the ploughs come to hand, whether the Government will be able to undertake the required ploughing, and when the ploughs are likely to be available.

E. T. MULLENS,
Secretary, Minister of Agriculture.

Department of Agriculture, Pietermaritzburg,
4th September, 1907.

Offers are invited for Two 6-Furrow Spalding-Robbins, Stump-Jumping Disc-Ploughs for Steam Traction. These have had little use, and the frames are as good as new, while the Ploughs were fitted with new discs last season. Landed cost of these was £56 each at the Point. Approximate weight, 2,000 lbs.

E. R. SAWER,
Director, Experiment Stations, Cedara.



STEAM PLOUGHING AT CEDARA.

Natal Agricultural Journal and Mining Record.

Dairying in Denmark.

THE almost unexampled prosperity of Denmark—a prosperity, let it be marked, that is not the result of a “boom” in the usually-accepted meaning of the term, but which has developed with an honest, steady growth—has excited the admiration and drawn the comment of every country that has entered or contemplate entering, the struggle of economic life. It is a healthy type of prosperity, and it is perhaps the soundness of it as much as anything that secures for it such a measure of admiration. The Commercial Agent for South Australia (Mr. A. E. M. Norton), who recently made a tour in Europe, and who has furnished to his Government some interesting observations upon that tour, attributes Denmark's prosperity to four main causes: the influence of education; small holdings (by which is meant peasant proprietorship); co-operation; and the judicious assistance given to producers by the Government. First outlining the system of education in vogue, Mr. Norton proceeds to comment upon the progress made by

THE DAIRYING INDUSTRY.

In 1876 to 1880 the total output of butter was, we learn, only a little over one million pounds sterling in value; sixteen years later, however, the export figures had reached over four and a half million pounds sterling, and now the output of co-operative dairies can be considered as over eight million pounds sterling per annum.

One of the largest farms visited by Mr. Norton was Bregentved, near Hasle, the property of Count Moltke. At the time of his visit there were 283 cows, chiefly of the Red Danish breed. The food used there is hay mixed with oats and barley, cake, beans and roots. The calves are fed with new milk until about three weeks old, when they are gradually used to skimmed milk and later on to roots and hay. The cows are in stalls

in rows, with passages between, along which the fodder is passed, and troughs are arranged for the cake, etc. There is always a constant supply of fresh water. At the head of each cow was a card setting forth the daily quantities of milk given, in pounds, the percentage of butter-fat, annual quantity of milk given, and other necessary data—as regards calves, etc. The cards were all numbered, and the corresponding number was burnt on the cow's horns. The cow that held the record for quantity of milk was six years old. Last year she gave 11,838 lbs. of milk, or 1,183 gallons, an average of 40 lbs. milk per day, with a percentage of butter-fat of 3.8. The record for butter-fat was held by a cow giving 35 lbs. per day, with a percentage of 4.5. The average yield of milk per cow on this farm varies from about 8,000 to 11,500 lbs. per annum, and the average annual value for each cow is about £15 sterling. This herd is housed nine months out of the year. The milk from the farm is sent to the Trifolium dairy.

TESTING THE HERD.

The importance of knowing the value of each cow as a milk-producer is fully recognised by the Dane. After years of ups and downs, experience began to teach him that it did not pay to feed "wasters." The fact that a cow gave milk was not in itself sufficient to warrant wasting food on her, as is often done in other countries. The Dane wants to know if the value of the milk given by this or that cow is sufficient to pay for her keep, and still leave a margin of profit for the keeper.

To this end, some thirteen years ago, Mr. Norton says, a very excellent and what has proved to be a most satisfactory system has been carried out of testing each cow. For this purpose farmers have formed themselves into societies. These societies employ practical men, who spend a given time at intervals on each farm belonging to the members; they test the quality and the quantity of the milk given by each cow, so that any member can know exactly which pays him to keep and which must go. Each society receives a subsidy from the Government. "It would be a rare thing, I think," remarks Mr. Norton, "to find a farmer in the whole of Denmark who did not belong to some such society."

In our September issue we referred to the advantages accruing to the dairy farmer from the keeping of proper records of the performances of his cows, in an article based upon a Circular issued by the United States Bureau of Animal Industry; and we would refer the reader to that article for an idea of United States opinion on the matter.

CO-OPERATIVE DAIRIES.

The most important co-operative dairy in Denmark, Mr. Norton says, is the Trifolium, at Hasle, which is said to have cost over £40,000. Last year this dairy received nearly 50,000,000 lbs. of milk, equal to 5,000,000 gallons. Butter-making is the principal feature, although a large quantity of cheese is made.

As is the case in all Danish dairies, the milk is carted by the factory itself, specially-constructed wagons being used for the purpose, each one capable of carrying up to 4,000 lbs. of milk. There are six or seven separators working, each with a skimming capacity of something like 2,400 lbs. per hour. There is also an ice-making machine, of a capacity of 100 lbs. per hour. The butter-making department was a feature particularly worthy of note—the beautifully fitted-up, well-ventilated and lighted room, with the suitable dress and the business-like attitude of the workers. At the time Mr. Norton visited it, the dairy was paying about sixpence per gallon for milk: the average price for the year is a little under that amount. It was stated that it took about 20 lbs. of milk to make one pound of butter.

Another very important institution which was visited was the Copenhagen Dairy Society's establishment, which is described as "the most remarkable institution of its kind in Europe." The origin of the institution dates back some thirty years, public attention having been drawn to the bad feeding and stabling of cows and its fatal influence on milk, and also the fact that the milk was often watered and adulterated. The society devoted itself to remedying matters, taking the following as its principal aims: (a) to take only milk provided from healthy cows; (b) to ensure scrupulous cleanliness in handling milk; (c) to keep the milk perfectly fresh by ice, so that when it reaches the buyer it has not suffered in value or purity.

At the present time the Dairy Society employs seven veterinary surgeons, who go every fifteen days to the farms and carefully inspect each cow. The inspectors are given sheets to be filled up by the society to indicate the number of cows that are ill or resting, and to give all particulars. The milk is filtered by a special process.

It is attention to such details, the importance of which is often underestimated, that has helped to place Denmark in the foremost position she now holds as a producer of dairy cows. Co-operation has accomplished much, but co-operative principles will avail little if the factors which go to establish purity and first-rate quality are not taken into account.

The beating of drums has been found efficacious by a correspondent of the *Country Gentleman* in clearing out a rat-infested farm near Washington, Pa., U.S.A. Rats were so numerous that they ate the fodder and nipped his cattle. He engaged four friends to help him, and they beat five snare drums about the house and farm buildings, causing the rats to scatter. It is stated that not a rat has been seen about the place since.

Mealie Export.

THE exportation of mealies this season has been attended with gratifying results, but there are various improvements necessary in our methods—as might be expected—the adoption of which will result in the attainment of greater success in future seasons.

Among these improvements may be here singled out a suggestion which has been made by the District Traffic Superintendent, N.G.R., Point (Mr. J. McConnachie) with reference to the introduction of a smaller bag for the purposes of the export trade. The muid of mealies weighs approximately 203 lbs., and is, as will be generally conceded, by reason of its weight awkward to handle and stack. It is further, for the same reason, extremely liable to damage while being loaded and discharged into and from trucks. The heavy weight, moreover, causes great fatigue to the labourers employed in handling the sacks, and consequently it is not possible to get the amount of work from them that might be obtained were lighter packages in use; and in addition it is not possible to stack the heavy bags to anything like the height it would be possible to attain with a smaller and consequently lighter sack.

A trade custom is, of course, very difficult to change, but it may be pointed out that the proposed adoption of a lighter sack would only be for the purposes of the export trade, and would not involve the entire abolition of the muid sack in all branches of the local mealie trade. New bags are in any case necessary for export purposes; and as far as the rapid estimation of the extent of export is concerned, the adoption of a sack weighing, say, one-fourth of the English standard quarter—as Mr. McConnachie has suggested—would permit of the English basis of grain measurement (the quarter) being used, as four sacks of 120 lbs. each would make up one quarter of 480 lbs. The introduction of such a bag would, furthermore, fit in better with the requirements of the English market than our present muid does.

We recommend this suggestion to the attention of our readers, and would be glad to receive expressions of opinion on the matter from those interested.

Whilst we are on the subject of the exportation of mealies, we may perhaps be permitted to draw attention to the necessity for care on the part of farmers in the Orange River Colony in the matter of the bagging of their grain for export. Mealies should be free from refuse of any kind, and should be bagged in good, clean, strong bags, well sewn to withstand the knocking about that they must receive on the journey. The O.R.C. Director of Agriculture has, we believe, promised to give the matter of

packing and grading his immediate attention, and there is no doubt that his efforts in this direction will be attended with beneficial results.

The question of careful packing and grading is not only a Natal one—though it affects this Colony considerably as all malies shipped from Durban, no matter what part of South Africa they may originally have come from, are looked upon in England and on the Continent as Natal grain—but it is also a South African one; and it consequently behoves all who intend taking part in the general tendency to export overseas to put their best efforts into the promotion of an export trade in grain on the soundest and most up-to-date lines.

Notes and Comments.

CAPE WINES FOR CANADA.—It's an ill wind that blows no one some good. A special telegram in the *Natal Mercury* at the end of October stated that, according to advices received from Canada, there is a splendid chance in that country now for Cape wines and brandies, as the French Canadians have decided to boycott French wines on account of the religious outrages in France, and the Protestants have joined out of sympathy.

FARMING OUTLOOK IN BASUTOLAND.—A *Reuter* telegram from Maseru states the present outlook for farmers and natives in Basutoland is serious owing to the dryness of the ground. Consequent upon the lack of rain they are unable to plough. The early mealies and Kafir corn are nearly all destroyed by worms and insects. Most farmers and natives are therefore re-sowing. Rain is further required to ripen the mealies before the frost falls, also for wheat in the ear; otherwise, it is stated, the later crop will be a failure.

BERGVILLE LUNGSICKNESS INFECTED AREA.—The area comprised by the farms "Woodford," "Hortonradford," "Lytton," "North Dalton," "Bethuny," and that portion of the farm "Roodebuldt" owned by Mr. D. D. Newton, and marked off by red flags, in the Magisterial Division of Bergville, has been proclaimed (Proc. 53, 1907), an infected area within the meaning of the Lungsickness Prevention Act of 1897. The removal of any cattle from that area, whether the same are or are not infected with lungsickness, is accordingly unlawful, the penalty for an offence being a fine not exceeding £20, or imprisonment, with or without hard labour, for a period not exceeding three months.

NEW NITRATE BEDS IN CHILI.—The Minister of Finance of Chili has declared in the Senate that the rumour current in Europe of the impending exhaustion of the nitrate supply was unfounded. He stated that deposits had been discovered at Antofagasta and Tocopilla as rich as the original deposits at Tarapaca.

PACKSADDLE FOR MILK TRANSPORT.—A packsaddle for the conveyance of milk and cream, which should prove of interest to farmers and others, is at present on view at the offices of the Department of Agriculture. Those desirous of examining it should pay a visit to the Department, where it will be shown to them. In the December, 1906, number of the *Journal* (page 1,138) will be found a note by Mr. E. O. Challis (together with an illustration) on the transport of milk in hilly countries, in which reference is made to this saddle.

A NEW BOX-MAKING MACHINE.—A new automatic box machine has been invented by Mr. George B. Parker, a Californian. According to the *Californian Fruit Grower*, the machine resembles the linotype not a little in its operation, and occupies a floor space 6 x 8 feet in area. The box shook is fed into the machine automatically from the four sides and the top, the machine assembles the several pieces, and when they are in place 34 plungers drive the nails in. These are fed through copper tubes much in the same manner that matrices are assembled in the linotype. The nail is held firmly in place until it is nearly driven in the wood, reducing the possibility of the nail bending to a minimum. The operation completed, the box is pushed on to a chute which carries it to the packer. The machine requires two men to run it, and turns out boxes at the rate of about fifteen per minute.

EAST COAST FEVER.—The Minister of Agriculture has cancelled the order contained in Government Notice No. 235, 1907, of the 20th April, which declared that portion of Natal, defined as follows, to be an infected area within the meaning of the East Coast Fever Act: That portion of the Colony of Natal bounded on the East by the Main Line of Railway from the Point to its junction with the Cape-Natal Line at Pietermaritzburg, on the North by the Cape-Natal Line as far as Creighton, thence by the Railway fence to its junction with farm No. 35, thence by the fence running to farm No. 36, thence by the dividing fences between the farms 35 and 36 and 38 and 39 to the Umzimkulu, on the West by the Umzimkulu River, and on the South by the Indian Ocean. The movement of cattle into and from this area will, therefore, in future be permitted. The effect of this notice is to permit of the movement across the Cape-Natal line; but it in no way affects the existing Government Notice quarantining the Alexandra, Ixopo, Richmond, and other districts south of the Cape-Natal Line.

DESTRUCTION OF LOCUST EGGS.—A telegram received by the Department of Agriculture from Mount Edgecombe states that, notwithstanding the fact that the invasion of locusts this season is the heaviest experienced for many years, various maggots and diseases have destroyed practically all the eggs laid, and there are consequently no young locusts hatching in the locality.

NATAL MEALIES FOR CANARY ISLANDS.—Reliable information received by the Government goes to show that there is a good prospect of Natal mealies being imported into the Grand Canary; and negotiations are being entered into with leading merchants at Las Palmas with a view to establishing an export trade to that country. Natal mealies are apparently viewed with favour by representatives of houses in the Grand Canary; and it is probable that a considerable export trade in our grain with that country will be the outcome of the Government's efforts.

FOOD VALUE OF SUGAR.—According to the *New England Grocer*, a noted English physician considers that everybody should eat a quarter of a pound of sweets daily. "Nothing is more strengthening," he says, "than sugar. It is possible to work for hours after eating four ounces of chocolate without feeling the slightest fatigue. If I had my way, every soldier in the British army would be allowed a quarter of a pound of sweets every day. My practice is to take five or six lumps of sugar in every cup of coffee or tea." The old belief was that sweets of all kinds were bad as food and interfered with digestion. But we know now that they are real food, and are especially good for us when we are fagged out nervously. Children are unceasingly active, and they always crave something sweet. The craving comes from an actual bodily need.

APICULTURE.—In our correspondence pages will be found an interesting letter on apiculture from a correspondent signing himself "Observer." The awakening to be observed in Natal to the advantages of bee-keeping is indeed a pleasing sign and promises well for the future. Apart from the pleasures of bee-keeping as a hobby, viewed from a financial standpoint no industry perhaps approaches it in the profits on the outlay, when the time spent on the work in the apiary is taken into consideration. The bee-keeper has only to provide a home for his bees, and receptacles in which they may store their surplus, and they will roam afield, gathering honey in abundance from morning till night. But as our correspondent points out, modern appliances are necessary if the best results are to be obtained. We shall be glad to hear from other readers of the success or otherwise which has attended their efforts in this interesting and profitable industry.

GINGER.—A report received by the Cape Government from the Cape Trades Commissioner in London, states that the crop of green ginger this season is an exceedingly small one, and that the article is accordingly expected to become very scarce. The usual wholesale price is 1s. per lb., while the article is now commanding 1s. 9d.; the retail price being 2s. 6d. per lb.

GRANTS TO AGRICULTURAL SOCIETIES.—In consequence of the heavy expense to which the Government has been put in guarding the Colony against East Coast Fever and in destroying locusts, and of the extremely difficult financial position in which the Colony finds itself, the Government has been compelled to withhold the payment of further grants to Agricultural Societies in respect of their annual shows, after those due in respect to Shows held last season have been paid. A circular to this effect has been sent to the secretaries of the various Agricultural Societies by the Minister of Agriculture.

MOLASSES AND CATTLE TICKS.—According to the *Louisiana Planter*, experiments made at Brisbane (Australia) with some valuable dairy cattle have shown that the consumption of molasses by the dairy cattle was in some manner inimical to the existence of cattle ticks. In the Logan district a farmer had kept his cattle free of redwater by giving them molasses; and this report led Mr. Thurlow, of Brisbane, to experiment with dairy cattle. He prepared for them a solution of water and molasses, about half and half, to which the animals went with freedom, and ever since all of the animals, it is stated, were free from ticks. The proportion of molasses was subsequently reduced and even then it was found quite effective in keeping the stock clean. No difficulty is reported in developing a taste for the molasses and water and the use for the purpose of freeing animals of ticks is considered now as a demonstrated success. Mr. T. W. Crawford, of the Mossman Central Factory, reported that a good deal of trouble had been experienced with ticks among the dairy cattle at that centre, and to so great an extent that at one time they were reduced to the use of condensed milk exclusively. They then hit upon the idea of an external molasses wash, using two parts of water to one of molasses. The cows were smeared with this mixture and it was said that every tick on the animals was dead by the following morning and that now they have no trouble with the ticks at the mill. It is even said that molasses is superior to the ordinary cattle dips used for killing ticks, as the molasses kills the ticks almost immediately and the standard cattle dip takes several days. Further, it is not necessary to take any precaution against animals licking themselves, as the molasses does them more good than harm. Incidentally, it is stated that in milking a smeared cow, it is only necessary for the operator to throw a bag over the animal's loins, against which he can rest his head.

EXPORTATION OF OSTRICHES.—In most of the Colonies and Protectorates of South Africa laws are now in force regulating the exportation of ostriches and ostrich eggs on the lines similar to those of the Natal Act passed last Session. The Orange River Colony Government intends introducing an Ordinance on the subject during the December Session of Parliament, and the High Commissioner for South Africa intends issuing proclamations in Basutoland, Bechuanaland Protectorate, and Swaziland, prohibiting, under penalty, exportation of ostriches or their eggs, to take effect from 1st December.

SUMATRA TOBACCO IN U.S.A.—The Acting British Consul at Savannah (Mr. A. Harkness) reports, according to the *Board of Trade Journal*, that the culture of Sumatra tobacco has grown to considerable proportions below Bainbridge, in Decatur County, Georgia, and around Quincy, Florida, about twenty-five miles east of Bainbridge. This tobacco sells for fancy prices and is mostly shipped to factories in the north, to Tampa and even Cuba. There is said to be no better wrapper grown than is produced in that section of Georgia and Florida. It is reported that a company has been organised at Madison, Florida, with a capital of 50,000 dols., for the purpose of cultivating Sumatra tobacco on a large scale; stores and warehouses have been secured and 160 acres of land purchased to be planted with tobacco. It is also reported from Jesup, in Wayne County, Georgia, that successful experiments in tobacco growing have been made there this year, and it is expected that a company for extensive tobacco culture will be formed in that county next year.

TURNIP MANURIAL EXPERIMENTS.—Experiments with fertilizers in the cultivation of turnips, undertaken by the West of Scotland Agricultural College under the supervision of Prof. Wright, have established that superphosphate forms a more effective manure for the turnip crop when applied in the drills in spring than when broadcast on the land in winter, and a similar effect has been observed with the use of basic slag upon the same plan. Kainit and the other potash manures also generally, though not invariably, give the best results on the turnip crop when applied in the drills in spring. The relative efficacy of the winter and the spring application has been found to vary with the season; in some years the spring application may be only moderately, if at all, superior. Potash appears to be of nearly equal efficacy for the turnip crop in the three forms of kainit, muriate of potash, and potash manure salt, but kainit is somewhat the more effective form of the three. Lime nitrogen appears likely to prove a valuable nitrogenous manure for the turnip crop; but more experiments are desirable as other experiments seem to show that the new nitrogenous fertilizer is not so suitable for roots as sulphate of ammonia or nitrate of soda.

A BACON FACTORY FOR O.R.C.—We learn from the *Wynberg Times* that it has been decided to erect a modern bacon factory at Ladybrand, in the Orange River Colony, from the designs of Messrs. Wm. Douglas and Sons, Ltd., of Putney, London. The factory will have all the modern equipment found to be suitable in European factories. The inception of the idea is due to the Hon. W. J. Palmer, M.L.C., Director of Agriculture of the O.R.C., and the proprietor is the Hon. H. W. Stockdale, M.L.C. The whole of the plant necessary will be made and fitted up by the designers of the factory.

A CELEBRATED PERSIAN RAM.—In this issue we publish an illustration of a celebrated Persian ram, for the original photograph of which we are indebted to Mr. Chas. W. Holmes, Maritzburg, Natal agent for Mr. Hougham Abrahamson, Long Hope Siding, Cape Colony, the breeder and owner of this famous ram. This ram—which is registered in the Auxiliary Stud Book of the Cape Stud-Breeders' Association—has, we are informed, taken first prize at all the agricultural shows exhibited during the last three years, those at Grahamstown and Port Elizabeth being the principal ones. He may therefore be safely allotted first place in the quality of this particular breed. A few years ago Persian sheep were practically unknown in South Africa, but lately there has been a great inclination among our farmers to go in for this class of sheep, they being in many respects profitable. Should any of our readers desire further information respecting Mr. Abrahamson's flock we would suggest their communicating with the local agent.

MOLASSES AND FIRE.—A writer in the *Bundaberg Mail* (Australia) draws attention to the fire-extinguishing properties of molasses. He states that, having occasion some time ago to scientifically investigate the properties of molasses, he found it a very difficult problem to burn off a large quantity of surplus molasses without the aid of specially constructed furnaces. Molasses is not, he says, the highly inflammable mixture that people imagine it to be, and goes on to remark that it would be practically impossible to set a tank of molasses on fire by any means whatever. Even a mixture of molasses and methylated spirits or sulphur will burn very imperfectly at first, and finally smolder and die out. A charge of molasses will extinguish or damp down the strongest furnace fire in a few minutes. A jet of molasses played on burning wood will instantly extinguish the fire, and the wood cannot be again fired until the molasses is removed from the surface. For extinguishing large tanks of burning oil, kerosene, or spirit, there is nothing more effective than bags or tarpaulins steeped in molasses, and when such tanks are in danger of being fired they should be covered over and made air-tight with tarpaulins that have previously been immersed in heavy molasses.

A POISONOUS PLANT (*Urginea lilacina*).—Some specimens of a wild plant (*Urginea lilacina*), reported to be very deadly to cattle, were recently forwarded to the Minister of Agriculture for examination. It was stated that, in one troop of 26 cattle, 24 head were lost through poisoning by this plant. The specimens were sent to Mr. Alex. Pardy, the Analyst at the Central Experiment Farm, who states: "The plants had a root-stock of scales forming a bulb and in general appearance resembled an onion. When cut the bulb was found to be of a white colour, with little or no odour, slimy to the touch, and almost tasteless. I was able to separate out a gummy material and also a toxic principle of a glucosidal character, either scillitoxin or an allied substance. This is stated to be an asthenic and a powerful heart-poison." Mr. Pardy says that the bulbs contained nearly the whole of the glucoside, the stem and modified leaves being found to contain only small quantities. He is unable to state what specific antidote is used for this poison, but from its reactions he suggests tannin (infusion of wattle bark) and also the use of an emetic.

DISEASED POTATOES AS STOCK FOOD.—The large percentage of diseased tubers in the British potato crop this season has brought up the question of the value of such diseased potatoes as stock food. In the *London Times* in October it was remarked that "diseased tubers are useful as pig food and are an asset of appreciable value," to which statement a correspondent, in a later issue, took exception. Referring to a report of the "Kaiserliche Biologische Anstalt für Land und Forstwirtschaft," of February, 1907, which dealt with results obtained in some feeding experiments with diseased potatoes, he pointed out that the experiments proved that the diseased tubers, although in small quantities in the raw or boiled condition they showed no injurious effect on the cattle and pigs experimented upon, when given in large quantities produced slight attacks of diarrhoea. His own observations, however, had shown that the degree of the digestive organs largely depended upon the degree the tubers were diseased, and that in some cases, especially with younger animals, the effect might be more serious than that set forth in the experiments alluded to. The diseases present in the tubers used in the experiments were caused by two well-known parasitic micro-organisms—i.e., *Bacillus phytophthorus* ("wet rot") and *Phytophthora infestans*. "Quite apart from the question of unwholesome fodder," the writer in the *Times* concludes, "it is proved beyond doubt that the parasitic mode of life of these micro-organisms reduces considerably the nutritive value of the tubers, and I would, therefore, suggest that the diseased portions be cut away and badly-diseased tubers be not used on any account. Healthy and well-thriving animals would be sufficient compensation for increased labour."

A NEW SWEET POTATO.—We learn from an American paper that the Californian experiment station at Berkeley has come into possession of a new sweet potato. Macomber's sweet potato, it is stated, is white-fleshed, and was obtained on Pagan Island, one of the Ladrone group, by Capt. J. A. Macomber, of Oakland. Capt. Macomber was struck with the delicate flavour of the tuber, and when leaving Pagan Island took a supply of tubers aboard his schooner for consumption on his voyage. He noticed that the tubers had splendid keeping qualities, and upon his arrival in California in November, he kindly donated what tubers he had left to the experiment station of the University. The tubers when received were in a remarkable state of preservation, notwithstanding the fact that they had been lifted in April, some eight months before. The tubers donated by Capt. Macomber have been propagated, and a limited number of tubers secured for distribution. It is stated that the tubers yield many more cuttings than does the ordinary type, and that quite a large number of plants can be secured from a single tuber if properly handled. It is a very prolific variety, with tendency toward deep growth of large tubers. Trial will, of course, be necessary to determine its cultural and market value.

A NEW CORN EXCHANGE.—Messrs. Reid & Acutt's announcement in the daily press of their intention to establish a public market in Durban for mealies "in order that farmers generally may be kept in constant touch with the actual state of the market from time to time, and thus avoid the uncertainty as to the ruling prices which has hitherto resulted from their having to rely solely on 'private offers' for their produce," will doubtless be received with interest by all connected with our newly organised mealie export. Messrs. Reid & Acutt's proposal is to establish a regular system of public auctions on the same lines as in the case of wool and other produce. Catalogues are to be distributed amongst all the local buyers, each sale being duly advertised in the daily papers so as to ensure the attendance of every purchaser, whether speculator, miller, shipper or otherwise, and thus secure the maximum price obtainable. It is stated that all produce will be sold for spot cash (within twenty-four hours) as in the case of wool, hides, bark, etc., and account sales with remittance rendered the following day. In all cases where reserves are not reached, customers are to be advised of the prices offered immediately after the sales. They will then have the option of either holding over for a future sale or shipping on their own account, as they may decide. Arrangements have, it is stated, been made with experienced agents for dealing with such consignments, either in London or on the Continent, at moderate rates. We would suggest that those interested should place themselves in communication with Messrs. Reid & Acutt (P.O. Box 89, Durban), who would doubtless be pleased to send a copy of their circular on the subject.

RETRENCHMENT.—As most of our readers are now probably well aware, the Government has been unavoidably compelled, by the stress of financial circumstances, to turn its attention to the question of retrenchment on a large scale in the various Departments of the Public Service. The Ministerial Department of Agriculture has been the first to come under the pruning knife, those of the scientific staff to be retrenched being District Veterinary Surgeons Donaldson, Beckett, Cordy and Webb, of the Veterinary Department, and the Conservator of Forests and District Forest Officer, Lower Natal. Mr. Woollatt, the Principal Veterinary Surgeon, has also severed his connection with the Department, his name having been, at his own request, placed at the head of the list of those to be retrenched, as he felt that he could not continue his work in a satisfactory manner with a staff reduced to such an extent. Mr. Power, we understand, takes Mr. Woollatt's place as Chief of the Veterinary Division; while Mr. Harber, lately officiating District Veterinary Surgeon at Greytown, has been transferred to the Government Bacteriologist's Department. Mr. Claude Fuller (Government Entomologist) and Mr. E. R. Sawyer (Director, Experiment Stations) take over Mr. Sim's duties—the former those connected with fruit culture, etc., and the latter those dealing with forestry.

DESTRUCTION OF HOMING PIGEONS.—Homing pigeons have a large circle of admirers in South Africa, and there are in existence several clubs which annually organise races for test purposes. The season is now in full swing, and several races have taken place. Unfortunately, however, many birds are being lost through indiscriminate shooting by farmers and others over whose land the birds pass. A man out with a gun often does not hesitate to shoot at any bird that happens along, and through his carelessness he often lays low one of our favourite "homers." In times of peace the shooting of these birds is nothing short of shameful. Where humanitarian views exercise no effect, however, the law steps in; and consequently it may be advisable to draw attention to the fact that these birds are protected by an Act of Parliament passed during 1904, viz., Act No. 13, 1904, "to amend Act No. 33, 1896, entitled Act 'For the protection of certain insectivorous and other wild birds.'" By this Act, homing or carrier pigeons are added to the schedule of protected birds in the original Act. By the provisions of Act No. 33, 1896, no person may "kill, catch, shoot at, or attempt to kill, catch, or aid in killing, catching, or shooting at" any of the birds specified in the Schedule to the Act, and no person may "at any time take, injure, or destroy the eggs of any of the said birds, except by express permission of the Governor for the purposes of scientific research." The penalty for contravening any of the provisions of this Act is a fine of not less than 2s. 6d. and not more than 10s., or imprisonment, with or without hard labour, for a period not ex-

ceeding one month. Any person contravening any of the provisions of the Act "may be detained by any constable, or the owner or occupier of the land upon which trespass is being made, unless he shall, when thereto required, give his full name and address." The penalty for giving a false name and address is a fine of £2. Section 3 of the Act of 1894 reads: "The Magistrate before whom any person is convicted of killing, catching, or shooting at homing or carrier pigeons may, in passing sentence, adjudge such person to pay to the owners of the pigeons the value thereof, or of the injury which may have been done to them, not exceeding Five Pounds Sterling, and any sum so awarded may be levied in execution of the Magistrate's judgment, together with the costs incidental to the levy."

MOVEMENT OF SOIL MOISTURE.—In an interesting bulletin issued by the Bureau of Soils of the U.S. Department of Agriculture, Mr. Edgar Buckingham gives the result of some studies made of the movement of soil moisture. He points out that, although the movement of the water in the soil, whether by the capillary forces exerted in the finer soil spaces at soil surfaces, or by distillation from one point to another, has long been regarded as a very important phenomenon and has often been investigated, nearly all the studies have been concerned with the movement of free water, in practically unlimited amounts, into a more or less dry soil. The much more practical problem of the movement of water from a soil short of optimum content to an even drier portion, or the distribution of the moisture content of the soil under conditions simulating those existing in the field, has hitherto received much less attention. It has become evident, from the studies which have been made so far, that the movement of moisture in the soil under such conditions is very slow—much slower, as a rule, than the growth of roots, which can, in a sense, reach out for needed water supplies more rapidly than the soil can bring the water to them. But while this feature of the problem can now be safely held to have but little if any immediate practical importance, the problem is one of great significance in the long run, especially in handling soils subject to conditions of drought. Mr. Buckingham shows, in his bulletin, that the loss of water by evaporation from points below the surface, while it does take place in measurable quantities, is nevertheless quite small, and is negligible in comparison with the losses taking place at or very near the surface. The movement of water vapour through the soil is shown to follow the law governing the diffusion of other gases through porous media, and is quite slow. Mulching decreases or inhibits the capillary flow, and diffusion through the mulch is practically negligible. This practice is very effective in conserving soil moisture, and is founded on sound scientific principles. An especially interesting illustration is brought out in the comparison of the loss of water from a soil under arid and humid conditions, respectively. As might be expected, the loss at

first is much more rapid under the arid conditions—so rapid, in fact, as to overtax the soil's ability to move water from within to the surface by capillarity, and in consequence a dry layer or mulch is formed which keeps the subsequent losses far below those which take place from the soil under humid conditions, where the capillary flow to the surface persists until the moisture content of the whole soil is very low indeed. The laboratory experiments described in the bulletin clear up, therefore, in a very satisfactory manner, the well-known and apparently contradictory facts observed in the field that the soils of arid regions, at depths a little below the surface, are generally wetter and hold their moisture for much longer periods than do the soils of humid areas in dry seasons.

Presentation to Mr. Mullens.

AMONG the several changes which the last month or two have witnessed in the *personnel* of the Department of Agriculture has been that in the Head of the Department. The designation "Secretary to the Minister of Agriculture" has been abolished and that of Under Secretary for Agriculture created, Mr. H. A. Hime, late Assistant Under Secretary (Colonial Secretary's Department) filling the position.

Upon the occasion of his severing his connection with the Department, Mr. Mullens was presented by the officers of the Ministerial Department of Agriculture with tokens of the esteem in which they have held him, in the form of a beautiful marble clock and an equally handsome tantalus, each bearing a plate inscribed with the following words:—

Presented to

E. T. MULLENS, Esq.,

By the officers of the Ministerial Department of Agriculture, Natal,
upon the occasion of his severing his connection with the Department.

The presentation took place on Friday afternoon, the 22nd November, Mr. Pitchford (Government Bacteriologist) speaking on behalf of the assembled officers of the Department. Mr. Pitchford said:—

"Mr. Mullens, I have been asked by my colleagues of the Department of Agriculture to express on their behalf—and I am glad of the opportunity of speaking for myself also—our united regret at losing you. We all know that during the past years the welfare of our Department has always been a first consideration with you; and while you have been suc-

cessful in no small measure in promoting the success of the Department, you have at the same time secured the esteem and regard of those officers of the Department with whom you have been associated.

"In asking your acceptance of these slight tokens of this regard, we ask that you will not see in them the measure or extent of that regard but rather look upon them as a permanent record of the friendly relations which will, I believe, always exist between us, and of the esteem in which you will always be held by those who have had the privilege of working with you.

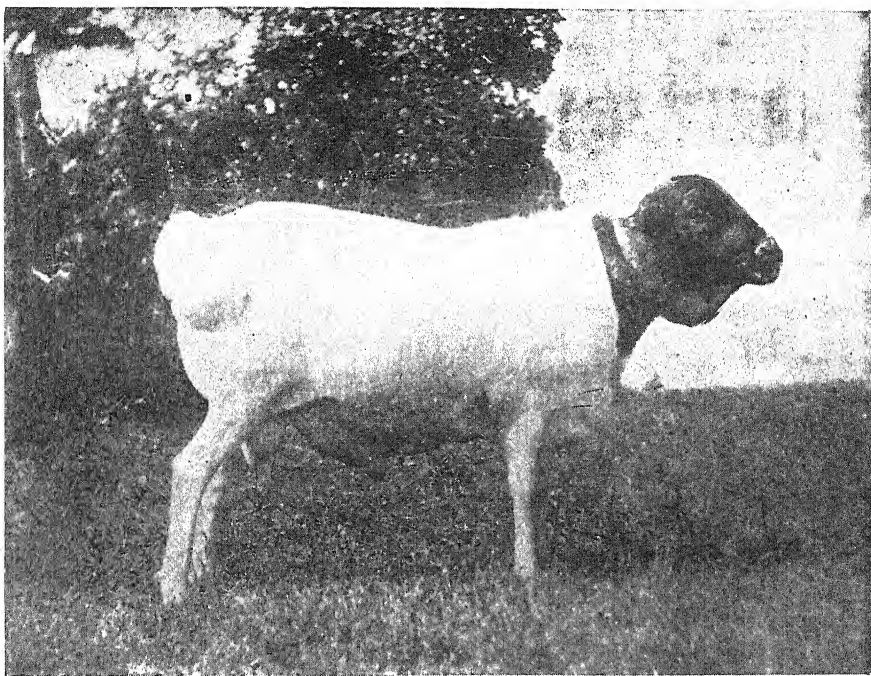
"Our token of appreciation is a representative one as from all the sub-departments of Agriculture, and as such we ask if you will accept and consider it as a representative one."

Mr. Mullens, in the course of his reply, expressed his sincere regret at leaving those with whom he had been for so long associated. He described the principles upon which he had worked, in so far as his relations with the officers of the Department were concerned; and in conclusion he hoped to be able to count upon them all as friends in the future as they had been in the past.

Mr. Mullens was transferred to the Department of Agriculture, as Secretary to the Minister of Agriculture, in October, 1901, having thus served under three Ministers of Agriculture. He takes away with him the respect and friendship of all the officers of the Department, who will unite with us in wishing him success in his new sphere of work.

According to Messrs. Thurle & Skidmore, New York, the United States used in 1906, 103,734 cases of Singapore pineapple, England using in the same year 346,087 cases.

The Santa Fe railway has made arrangements to send a representative to Australia to make a study of the eucalyptus trees of that country with a view to ascertaining their value as sleeper timber. According to the *California Fruit Grower* it is not the purpose of the railway company to import sleepers from Australia, but to study the trees, note the best species and secure seed of those not yet introduced in the United States. The Santa Fe Company began tree-planting last year on a large scale, and will, it is stated, plant 500,000 more trees in Southern California next winter.



A CELEBRATED PERSIAN RAM.
Bred by Mr. Hougham Adamson, Cape Colony.
(See "*Notes and Comments.*")

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experiment Stations.

VI.—INSECT PESTS AND DISEASES.

TOBACCO suffers in common with the potato and tomato, to which it is closely related, from the attacks of several widely distributed insect pests, and plant diseases, and heavy losses are only to be avoided by the adoption of a regular system of control based upon the habits and life of the individual forms.

COMMON INSECT PESTS.

The Tobacco Leaf Miner (Lita solanella) is in the adult stage better known perhaps as the Potato Moth, a small grey insect with delicately-fringed hinder wings which lays its eggs upon the leaves of the tobacco, especially in the seedling stage. The minute caterpillar, as soon as hatched, bores its way into the substance of the leaf and burrows between the upper and lower surfaces, leaving behind it a grey discolouration. In the case of the potato not only the leaf is attacked, but the grub makes its way down through the haulm and pupates in the tuber. The general presence of this pest renders the covering of the tobacco seed-beds with scrim-frames, as earlier suggested, a very necessary precaution. Should the moth appear in the field in considerable numbers, spraying with a solution of Paris Green may be advisable, especially when cigar wrapper is being grown. The grub does not pass its life in one place, but after a time chews its way to the outside of the leaf to enter the tissues again at another place, and this habit renders possible its destruction by means of a poisonous spray.

The Cut Worms, unfortunately too well known to call for much description, are probably the most serious enemy of the tobacco-planter. Hiding by day in the loose soil or beneath rubbish, the grubs, which represent the larvae of several species of moths, come out at night and eat plants at ground level, a habit which has given them their popular name. Their activity is considerable, and a few individuals may ruin the crop over a considerable area in a single night. Preventive measures are far better than doubtful remedies, and should be applied before the tobacco is transplanted. As soon as the ground is ploughed and harrowed, handfuls of poisoned bait should be scattered over the surface. In the absence of other food the cut-worm will travel considerable distances, and almost

certainly consume the poison. The bait may be prepared by mixing 1 lb. of Paris green with 50 lb. of fresh horse-dung or bran, the mixture being moistened with water and treacle. As an alternative, bunches of any green stuff may be sprayed with the Paris green solution and similarly distributed with equally satisfactory results.

The Tobacco Hornworm (*Sphinx sp*) is also a pest of the potato and tomato. The large green caterpillar, with whitish oblique stripes, gains its name from the horn seen on the hinder part of the back. The worm, as it comes from the egg, is very minute, but has a voracious appetite and rapidly grows to a length of about 4 inches. When full-fed it burrows into the earth, and pupates as a brown-coloured chrysalis with a curious projection like a jug-handle. The moth or perfect insect is of large size with wing-spread of about 5 inches, of a grey colour with five orange spots on each side of the body. Both moths and caterpillars should be systematically destroyed by hand-picking or through the agency of turkeys in the latter case, which is rendered the easier by their large size. If their ravages are very extensive this method should be supplemented by spraying with the Paris green solution.

The Eelworm is a very minute, white and almost invisible soil and root-infesting pest, which shows little or no discrimination in its choice of food-plants. Of recent years tobacco-planters in many parts of South Africa have suffered considerably from this cause, and have found control of the pest a matter of great difficulty. When their roots are attacked by the worm the tobacco-plants wilt and die, frequently without the true character of collapse being detected. The removal of the plantation to a new site is generally to be recommended, though some success has been secured from the application of a commercial insecticide known as "Vaporite." This should be broadcast at the rate of at least 300 lb. per acre, and ploughed under some time prior to transplanting the tobacco. As a less certain alternative, a root-crop, such as carrots or turnips, may be planted with the first rains and pulled early in the season, and the worms thus removed in the roots prior to egg-laying. The crop, however, cannot safely be fed to stock, for it has been shown that the pest pass unchanged through animals and re-infest the land if the manure be distributed.

PLANT DISEASES.

Wilt Disease (*Peronospora hyoscyami*) is of not infrequent occurrence in the seed-beds, and, once established, will almost inevitably destroy all seedlings present. The avoidance of a damp situation, the preliminary burning over of the beds and constant attention to their ventilation and occasional sunning should obviate danger from this cause.

Macrosporium Disease (*M. solani*) is probably caused by the same fungus as is responsible for the so-called "Leaf Blight" of potatoes. The brownish areas with concentric structure, characteristic of the disease, are

to be seen in almost any tobacco field at the end of a wet season, and it is only exceptionally that the quality of the crop is materially impaired. Where, however, there is any appearance of the disease spreading unduly, it may be held in check by the application of dilute Bordeaux mixture. It should be remembered that the fungus frequently continues to develop during the earlier stages of curing, and a final spraying shortly before harvesting is frequently desirable. Wrapper leaf should in particular receive such protection from possible damage.

Mildew or White Rust (*Oidium tabaci*) is occasionally a cause of damage in the seed-beds, in which case a dusting of sulphur should be resorted to. The treatment is unavailable, however, in the field, affecting, as it would do, the burn of the leaf. Attention to the drainage of the plantation, and the "priming," or removal of the lower leaves, of the plants, to allow free passage of air will generally be sufficient to prevent serious loss.

Mosaic Disease causes the leaves to grow more rapidly near the veins than elsewhere, and derives its name from the mottling of the lamina caused by the presence of alternating lighter and darker areas. Affected leaves become wrinkled and corrugated by irregular development, and consequently worthless for wrappers, and, indeed, for any purpose if highly diseased. Recent investigations go to show that the phenomenon is due to defective nutrition of the young growing leaves, owing frequently to a lack of nitrogenous food. The avoidance of injury to the roots in transplanting and cultivation, and the provision of suitable fertilisers or manures appear to be the only means within the reach of the planter for the prevention or modification of this condition.

"*Frog Eye*" is a term commonly used to denote the presence of small white specks in the tissues of the leaf, which are probably bacterial in character. The market has at times demanded this feature in cigar wrappers, and it has rarely been regarded as a disadvantage. No successful treatment for its prevention is known.

THE PREPARATION OF SPRAYING SOLUTIONS.

A knapsack pump and stock of spraying materials should be regarded as essential items in the tobacco-planter's outfit. Paris green, copper sulphate, soft soap and supplies of freshly-burnt lime are the required ingredients. A set of wooden tubs or barrels should be kept for this purpose. Both Paris green and the copper sulphate should be brought into solution by suspending the required quantity in a coarse gunny-bag in a barrellful of water. The lime, which must be freshly burnt, should be slaked in a separate barrel, by the repeated addition of small quantities of water until a fine, smooth paste is secured. If kept covered with water this may be employed for a considerable time. After slaking is completed, water is added to the paste to bring the whole up to 28 gallons, and the

lime water poured gradually into the solution of copper sulphate or Paris green, the mixture being continually stirred to promote combination. The following proportions should be observed:—

Paris Green Spray.

- 1 lb. Paris green.
- 2 lb. quick lime.
- 250 gallons water.

Bordeaux Mixture.

- 6 lb. copper sulphate.
- 6 lb. soft soap.
- 4 lb. quick lime.
- 40 gallons water.

The Bordeaux mixture should always be tested before application by insecting a clean knife blade into the solution. If the steel becomes discoloured a further quantity of lime water should be added. The addition of soft soap greatly increases the adhesive qualities of the spray. Paris green is not readily soluble in water and should be constantly stirred during use to prevent precipitation. Many spray pumps are provided with an agitator for this purpose. The sprays are preferably applied in the early morning after rain, and should not be used during the heat of the day. The number of applications necessary to afford complete protection will be determined by the character of the rainfall.

The Zimmerman Fruit-Evaporator.

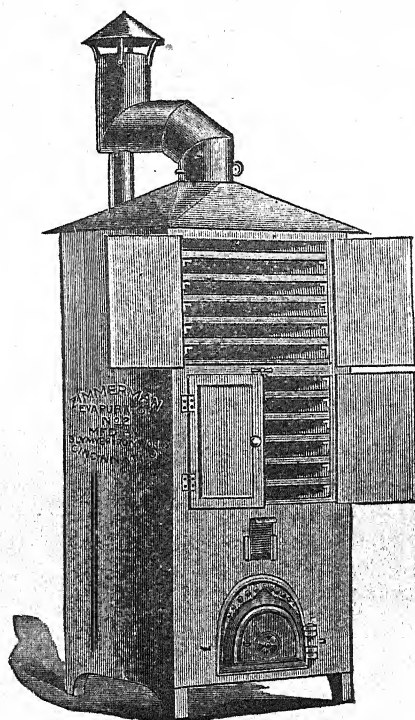
THE accompanying illustration of a fruit evaporator will doubtless prove of interest to readers of Mr. E. R. Sawyer's article on Fruit Drying and Evaporating in the last issue of the *Journal*. The particular evaporator shown is the Zimmerman (No. 2 type). Both Nos. 1 and 2 are designed for family use, but the No. 2 has a capacity sufficient to dry for market. The latter measures 24 inches deep by 26 inches wide and 5½ feet high. It is furnished with twelve galvanised wire trays, giving over 40 square feet of drying surface. Both Nos. 1 and 2 are made substantially of galvanised iron. The furnace front and back are made of heavy cast iron, and the body of the furnace of No. 18 boiler iron.

The following table gives the minimum capacities of machines Nos. 1, 2 and 3; which capacities can, it is stated, in each case be increased by attention and effort:—

CAPACITY PER DAY OF 24 HOURS.

Green Fruit.			No. 1.	No. 2.	No. 3.
			lbs.	lbs.	lbs.
Apples	...	...	150 to 200	300 to 350	750 to 1,000
Apricots	...	...	100	200 to 300	400 to 700
Peaches	...	...	100 to 150	200 to 300	400 to 700
Pears	...	...	125	250 to 350	500 to 800
Plums	...	...	100	200	500
Prunes	...	...	100	200	500

The agents in Pietermaritzburg are Messrs. Steel, Murray & Co.



ZIMMERMAN EVAPORATOR No. 2.

To make whitewash, slake one bushel of fresh lime with hot water. While slaking add one pound of glue previously dissolved in warm water and stir thoroughly. Before applying add sufficient bluing to give the tint desired. This whitewash is good for both inside and outside work.

Tree Culture.

LECTURE BY MR. T. R. SIM.

A most interesting and instructive lecture was delivered recently in Charlestown, under the auspices of the Public Library, by Mr. T. R. Sim, F.L.S., Conservator of Forests, writes the Charlestown correspondent of the *Natal Mercury*. The title of the lecture was "Tree Culture"; and, to those who attended, it was an education of the highest advantage. Dr. Briscoe, the President of the Library, presided, and introduced the lecturer.

Mr. Sim said that, although Charlestown had been spoken of as a bleak place, he had seen enough in the town and around the district to know for a certainty that trees did, and could, grow. It was for them to remember one or two things. The first thing was the

CLIMATIC CONDITIONS

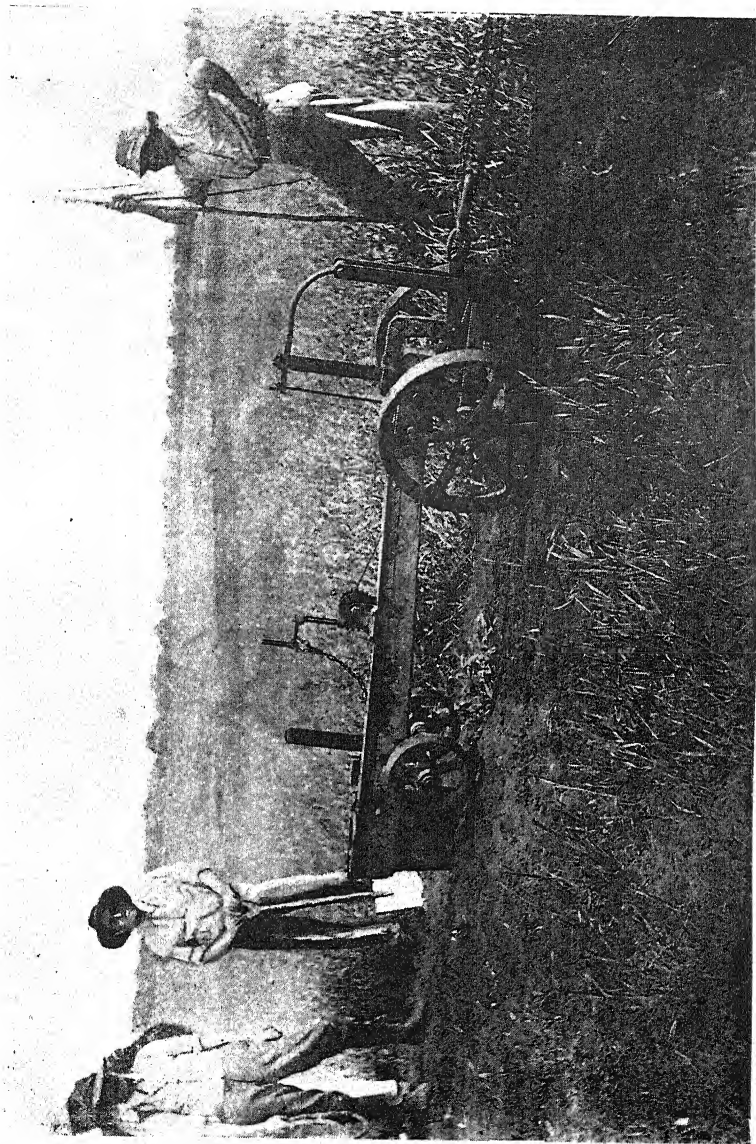
of a locality, this being the key to the whole question of tree culture. He then showed a sketch indicating the different altitudes of Natal, taking the first from the Coast to Botha's Hill, the second to Manderston, the third up to Hilton Road, the fourth to Highlands, then at Wessel's Nek, and up to Lang's Nek. The lecturer showed that on the eastern sides of these heights the moist winds from the Coast produced a more favourable condition for the growth of trees than on the western slopes of the same ridges, and one of the causes why so many failures had been made in tree planting at Charlestown had been the ignoring of this fact.

The fact that forests beget forests was apt to be lost sight of, and it would be found that the more trees one could get to grow, the easier would it become to grow a larger quantity. Generally speaking, Coast trees were poor in quality for useful woods, while the upper and midland districts produced good wood, and ought to produce much more.

Another essential requirement to the successful growth of trees was the

SELECTION OF SOILS

suitable for the various kinds of trees to be planted. The next thing was to select trees which had as nearly as possible come from a similar country or district. For instance, Australia in many parts was similar in climate and soil conditions to Natal, and it was found that most of the trees native to Australia would grow in Natal. California also being similar, the trees from there would mostly grow in Natal. The harder fruit trees of England and North America were somewhat similarly to be regarded, such as apples, pears, plums, etc., more especially in the upper districts of the Colony, although the dry winter militated against them to some extent.



MOLE PLOUGH IN ACTION.

Regarding trees for Charlestown district, the lecturer gave the names of three gum-trees, all of which could be planted with safety in the district, and all of which resisted the frost.

WATTLE PLANTING

in the town would not, in his opinion, be a success, but he had seen places within ten miles of Charlestown which ought to be bearing plantations of wattles, which would bring a rich yield. The *Pinus insignis* was a tree which, in spite of wind, could be safely planted, and become a beautiful, as well as a useful, tree. The cedar he had seen doing well in town. Of the distinctly European trees, the district should be able to carry the oak, the Spanish chestnut, the robinia, the hawthorn, the willow, and the poplar. The last-named tree, went on the lecturer, and especially the species known as the white poplar, was a tree for which there was an ever-growing demand in the Colony, and this tree, planted in shady spots, would be a source of wealth to the farmer.

FRUIT CULTURE.

The fruit trees came in for a large share of attention, and the lecturer said that the prospects of a large export trade mainly depended upon the value the grower put upon his article. Many of the fruits grown in Natal were produced in other countries, and sold at a cost on the Home market which the Natal grower said he could not pack for, far less pay the freight and other expenses; but he could assure them that strict attention to their trees in their earliest stages of growth, and careful pruning in after years, made all the difference to the yield. It should not be the ambition of growers to grow big trees, but to raise up short, bushy trees of just such a height as would enable them to pick the fruit without the aid of ladders planted against the trees. This method of collecting fruit could only be attained by the careful training of trees at their youngest stages, and the grower should not be in a hurry to make his trees bear before their time. It was interesting to note that something like 10½ millions' worth of fruit was imported into the United Kingdom per annum, and surely Natal should come in for a share of this large amount of trade, the more so that Natal fruit ripened some time before the Cape and other southern countries' products could get on to the market in their season.

A hearty vote of thanks brought the proceedings to a close.

The provincial council of Liege (Belgium) is endeavouring to stimulate the culture of vines by making a present of 200 vines to anyone undertaking to cultivate them.

Notes on the Drainage of Farm Lands.

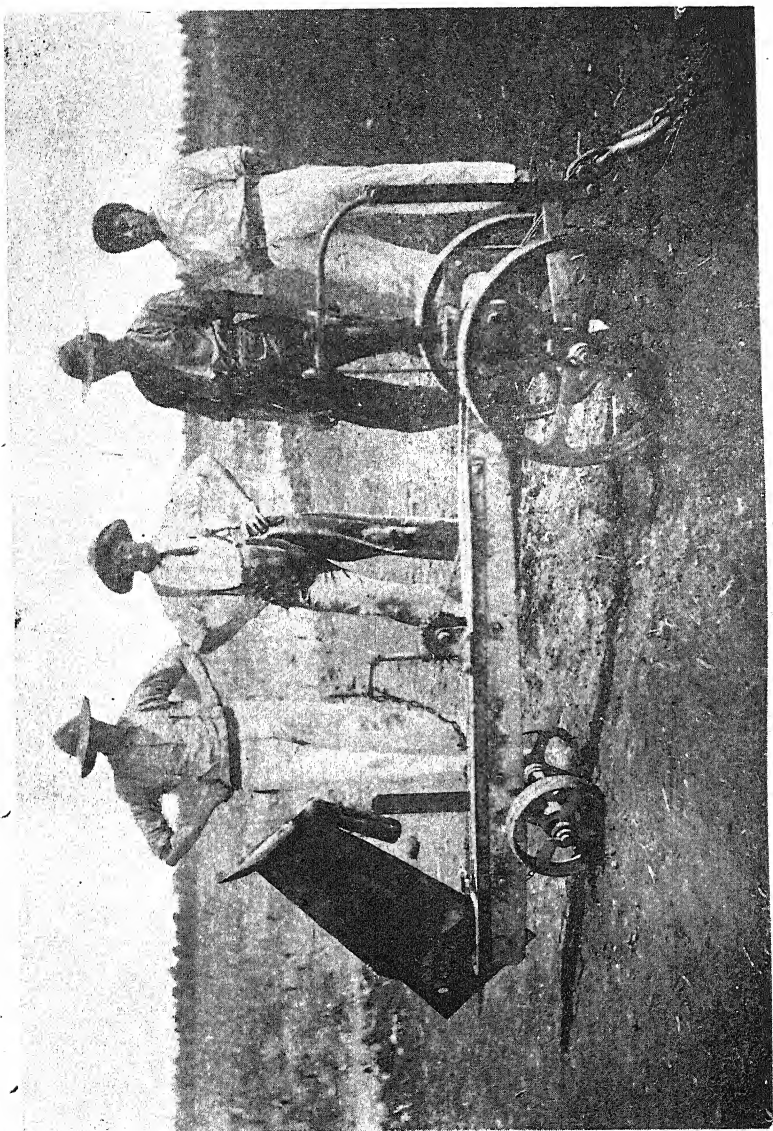
By E. R. SAWER, Director Experiment Stations.

THE establishment of an export trade in maize and other agricultural produce finds a natural reflection in current advances in the value of arable farms and a very considerable extension of cultural operations. Such circumstances lend a new importance to the problem of reclaiming, even at considerable expense, our alluvial soils as represented by vleis and low-lying flats, the potential resources of which probably exceed those of total areas now under cultivation. The removal of surplus and stagnant water from such lands to fit them for tillage and the cultivation of crops is a subject already engrossing attention, and a consideration of ways and means for effecting such reclamation will not, it is believed, be out of place.

Necessity for the adequate or artificial drainage of arable soils is determined by the fact that the roots of farm crops, with the exception of such aquatic plants as rice, require air and warmth as well as moisture. If the interstices of the soil be filled with stagnant water, seed planted will fail to germinate, and, if earlier conditions have been more favourable to establishment, the plants will subsequently be both suffocated and poisoned. It can be shown that seed maize will not germinate at a lower temperature than 55 degs. F., and blanks can frequently be attributed to the fact that this minimum has not been reached in cold, water-logged soil. The yellowing of maize in low-lying areas is directly due to the accumulation of noxious substances about the roots as a result of lack of aeration, and is comparable to a process of poisoning.

The nutrition of the crop is further dependent upon the maintenance of what may be termed a healthy circulation of soil water, which is only possible when good drainage exists. In the latter case two distinct movements of soil-moisture may be detected, obeying two opposing forces. Heavy rains falling on to the surface obey the law of gravity and sink into the subsoil, carrying with them from the atmosphere and surface soil food substances necessary to the growth of the crop. From the subsoil the surplus water is again drawn towards the surface during times of drought by capillary action comparable to that seen in the wick of a lamp. Upon this water circulation is based every system of farm drainage and cultivation.

If the rainfall, or "water of saturation," remains in the surface soil for many hours, much damage is done: if for several days, the crop is



MOLE PLOUGH FOR OPENING SUB-SOIL DRAINS IN STIFF CLAYS.

ruined. Similarly, if the "water table," or level at which the subsoil moisture stands, approaches too near the surface, unfavourable conditions again prevail, and call for control by means of subsoil drains. During prolonged periods of drought, on the other hand, the water table may fall several feet and capillary action fail to bring it to the surface in sufficient quantity without artificial assistance from such measures as are adopted in several well-known systems of "dry-land farming." Yet a further condition may be detected in which capillary action is so effective as to lead to undue upward movement of soil moisture and consequent exhaustion by excessive evaporation from the surface, especially during drying winds. The last case is to be obviated by the provision of a dust or vegetable mulch which acts as a natural lid to the reservoir of soil moisture by breaking the continuity of the capillary passages.

Cold and heavy soils hinder this free circulation, and therefore frequently require draining. A cold soil is one overlying an impermeable subsoil. A heavy soil is one containing a large proportion of clay. A clay soil contains a large proportion of small, closely-packed particles which hinder the passage of water. Sandy and gravelly soils on the other hand show a number of large open pores through which rain water passes rapidly, as gravity acts almost unobstructedly, though the best conditions for capillary movement may not be present, and the soil consequently a dry one. All soils do not therefore call for artificial drainage, even though situated in a low-lying area. If there is no surplus surface moisture because the land is already under-drained by nature, as in the case of sandy loams with a gravelly subsoil, it is only wasted expenditure to attempt draining.

There are certain external signs of the need of draining which can hardly be mistaken. Water standing in the furrows some hours after the rain has ceased, and a crust forming on the surface after sunshine which opens in small cracks are sure indications. On poorly drained lands the soil will stick to the boots, or to the hoofs of horses, and puddles will collect in the footmarks thus made. Damp patches at points where the surface is at a slightly lower level point to the desirability of draining the whole area. Where it is found that the roots of crops and trees lie near the surface instead of making vigorous and deep growth, a cause may generally be found in the accumulation of water near the surface, which will be confirmed by the presence of an unhealthy yellow colour in the subaerial portions of the plants. In such a situation a stick pushed into the soil forms a hole in which water collects, and removes a lump of putty-like clay. The presence of typical marsh plants such as water grass reeds, sedges, etc., are, of course, *prima facie* evidence of the need of thorough artificial drainage prior to the cultivation of the land.

A preliminary step to the organisation of drainage operations is the preparation of a contour map, to be supplemented by a careful determina-

tion of the lie of surface waters after heavy rains. The presence of hill-side springs at the outcrop of impervious strata renders a contour plan insufficient basis in itself for the construction of the final drainage map, which must be based upon all possible data. Such a map can only be safely compiled in a country where a dry season prevails at certain times of the year, after the occurrence of prolonged or heavy rains. Contouring, however, is an invaluable method of ascertaining the fall that can be given to, and the consequent capacity of, the proposed drains, and in view of the considerable outlay necessary to the completion of a satisfactory drainage scheme, careful preliminary survey is a matter of the first importance.

A first principle of modern draining is that "surplus moisture should be removed down through the soil and not off along its surface." Subsoil drainage has many advantages over a system of surface drains, among which mention may be made of the following:—It facilitates all cultural and harvesting operations. Open drains are better than none, but greatly impede the work of the farm. Subsoil drainage prevents loss of fertility as a result of surface washing. The latter removes not only fertilisers applied to the land, but also soluble salts and fine soil originally present. Surface wash or surface drainage cakes and puddles the upper soil. On the other hand where rainfall is drawn down through the soil, fertility is added by every shower, for the rain contains perceptible amounts of nitrogen and other substances of value, which are strained or filtered off by the soil particles and retained for the use of the crop. Subsoil drainage further warms the soil by removing surplus water, which would otherwise evaporate from the surface and chill the soil. It allows warm air to pass up from the subsoil in winter, and warm showers to soak down in spring. As already pointed out, undrained clay soils are for this reason "cold," and sandy loams "warm." Subsoil drainage also increases the extent of root-pasturage. Crops and trees do not send their roots below the level of frequent saturation. It increases the pulverisation of the subsoil, for a dry soil breaks up more quickly than a wet, and a saturated clay sets into a hard puddled mass if tramped by stock or worked by implements. Subsoil drainage finally assists crops to resist drought. A well-drained soil has an open sponge-like character, capable of absorbing and holding far larger quantities of water than an undrained clay, which when saturated becomes so compact that no interstices remain to be filled with water. During drought the latter soil will crack into clods which further the drying out process and are inimical to healthy root-development.

Open drains are only to be recommended for catchwater ditches at the foot of steep hill-slopes, for main drains to receive the outlets of lateral subsoil drains, and where the expense of closed drains is altogether prohibitive. The last-named consideration demands an enquiry

into the relative costs of the different forms of subsoil drains available for the purpose in view. At the outset it may be stated that tile-draining, though offering many advantages, calls for a capital outlay which may well cause cultivators to hesitate. Where an interval of thirty feet is allowed between laterals, an economic minimum in many classes of soil, 1,452 feet of tiles will be required to completely drain an acre, costing, at 2½d. per foot, no less than £15 2s. 6d. Drained land should in such case be the pick of the whole farm, and the additional increase in the yield of crop, as the result of drainage, more than sufficient to pay interest at the rate of 10 per cent. on this expenditure.

It is, however, even principally our object to point out satisfactory alternatives whereby subsoil drainage can be provided at far smaller cost. Excavating and filling of trenches are items of hardly smaller importance than the price of such materials as tiles, and a means has been found of obviating the necessity both for trenching and tiling, applicable to lands showing a stiff subsoil. The Mole Plough, as shown in the accompanying illustrations, consists essentially of a sharp, pointed wedge or roller carried on a broad, sharp shank some three feet in length. The cut made by the shank closes after the plough, while that made by the roller and shaped by the following plug, becomes a water-channel in the subsoil capable of carrying off surplus moisture. With a span of eighteen oxen ten acres a day may thus be drained and the channels in stiff clay will last for years. The landed cost of this implement is £28.

(To be continued.)

The London correspondent of the *Transvaal Leader* states that, in connection with the importation of Natal maize and similar products into Britain, it is urged that a better system of packing should be introduced, as coal dust and other factors tend to spoil the high prices which the produce ought to command.

Standing in the farmyard at Aisby, near Ancaster, is a wheat stack over thirty years old. The owner has vowed that he will not thresh the stack until wheat makes £3 per quarter. According to the latest official figures to hand the average price of wheat in England is 33s. 3d. per quarter; so that it is likely to be some considerable time yet before this stack gets threshed.

Natal Wattle Bark.

AMERICAN MARKET PROSPECTS.

POSSIBILITIES OF BARK EXTRACT.

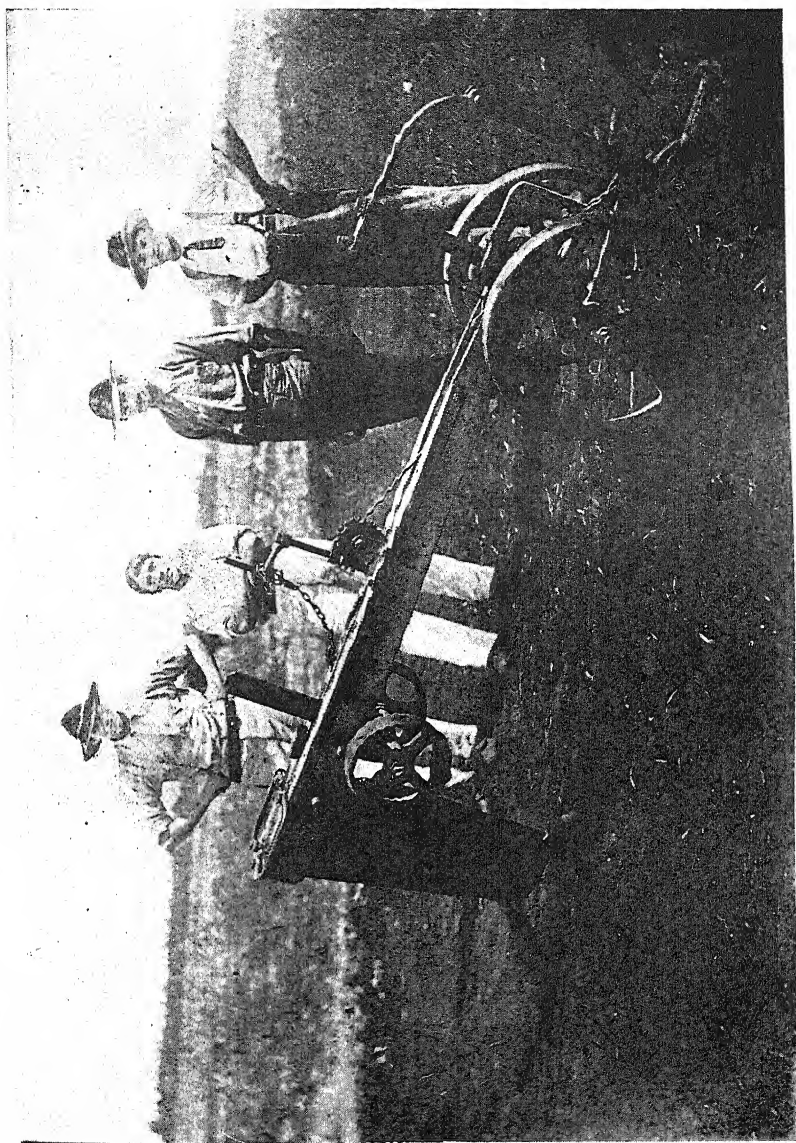
IN our September issue we published an article based upon information collected by the Agent-General, at the request of the Prime Minister, relative to the present conditions and future prospects of the European and other markets for wattle bark. Other communications have since been received from the Agent-General, enclosing further correspondence, dealing with the American market, and also with the prospects of bark extract.

Enquiries were made on behalf of the Agent-General through the Commercial Intelligence Branch of the London Board of Trade by the British Acting Consul-General at New York. From the letters forwarded there does not seem to be very much prospect of wattle bark being imported by the United States under present conditions to any considerable extent. One firm written to stated, in fact, that they have had on their hands for three years a consignment of fifteen tons of wattle bark which they have been absolutely unable to dispose of.

According to an United States Forest Service Circular, the consumption in 1905 (based upon reports received from 477 tanneries) was some 800,000 cords of hemlock bark and some 304,000 cords of oak bark, the total value of the same amounting to 8,232,457 dollars (£1,715,095). The consumption is less than that of 1900 by 512,020 cords; but against this the consumption of extracts has increased from 67,000 barrels of 500 lbs. each to 292,400 barrels, of which 52,400 were hemlock, 187,600 oak, 51,200 chestnut, and 1,100 palmetto.

In the large tanneries on the Pacific Coast the principal tannin agent has been the tan oak bark, which is chiefly obtained from California, mixed with a small amount of imported material or extract. The leather produced is an exceedingly high grade of heavy leather, such as is used for belting, soling skirting, etc., and for this kind of leather it is claimed that nothing equals tan oak.

Quebracho wood from the Argentine is also largely used on the Pacific Coast in the form of a dry extract. This dry extract is not as popular as the liquid extract, but transportation charges compel, at present, the use of the former in California. Quebracho, which has only in recent years been employed in any quantity in California, is invariably mixed with tan oak bark and not used by itself, the proportion generally



MOLE PLOUGH : METHOD OF INSERTION.

being a quarter quebracho and the remainder tan oak. The tanner demands that his tannin agent should not only contain a high percentage of tannin but also certain other acids such as gallic or acetic. Quebracho wood contains from 40 to 50 per cent. of tannin, while the Venezuelan mangrove contains about 23 per cent. and the African 35 per cent. The Venezuelan sells at from 15 to 16 dollars and the African at 40 dollars per ton.

The tendency of the American tanners to-day is towards the use of extracts instead of bark. There is practically no waste or residue in the use of extracts; and as extracts are more convenient to use and their action is quicker, the American as well as the European tanners are, it is stated, much more kindly disposed towards the use of extracts than towards bark. The consumption in America of quebracho extract has, for example, during several years past grown very largely and has to a great extent taken the place of bark and other materials.

One correspondent states that he has been consulted by several growers in Natal, and that there has been a suggestion to make extract in this country. This he considers would be an excellent plan, for, he says, "a good extract would find a market not only in this country (*i.e.*, England), but in the United States, where there is a vast market." He points out, as other correspondents have done, that Natal bark has up till now not been largely dealt with in America, but adds that there is no doubt whatever that this material could be used over there. The only large importing firm which is handling it at all in the United States, it is stated, is Messrs. A. Klipstein & Co., of 122, Pearl Street, New York.

The same correspondent remarks that it is difficult to say exactly what the future of Natal wattle bark in England will be. A certain amount of our bark, he says, is always being used, although its use has gone down of late owing to the considerably cheaper tanning materials which have been offering on the market. There has been an over-production of chestnut extract, which has brought down its price in some cases to below cost. This has been used instead of barks and other fibres. It is considered, however, that when the market rights itself Natal bark will come back into favour, and the writer sees "no reason why the old price of about £10 a ton might not be obtained if of good quality and properly harvested."

The chief factor which places our wattle bark at a disadvantage in competition with other tanning materials in the United States is the high prices which up to the present time have been quoted. Although the sea freights are low, nearly all the tanneries in the United States are located inland, and the combination of ocean and inland rail freights on an article of which probably not more than one-third of the weight could be utilised in the manufacture of leather (the residue after the tannin has been exhausted being only adapted for very poor fuel), added to the

prime cost would prove, it is said, too expensive for the use of American tanners. One firm remarks that, "although it is possible that in ten or a dozen years from the present time the conditions may so change that the American tanners would be likely to consider the use of this bark, there is certainly nothing in the present situation to warrant their doing so."

The Stamford Manufacturing Co., importers of chemicals and dyes, 88, Wall Street, New York, would, however, be glad to hear from any one who has bark to sell and wishes to try and open up a business in the United States.

Mining in Madagascar.

PROVISIONS OF THE NEW LAW.

A COPY of the Madagascar Mining Law of the 23rd May, 1907, has been received. This Law regulates the prospecting and working of natural deposits of gold and of precious metals such as silver and platinum, also of stones, whether alluvial, conglomerate, strata or reef. All strata or reefs of quartz or other rock containing gold or other precious metals, or precious stones, are considered as "reef" deposits. All other deposits are considered as "alluvial." The prospecting and working of other minerals are subject to the provisions of a special Decree.

Before prospecting, a permit must be obtained from the Chief of the Mines Department. Such permit will confer on the holder the exclusive right to dig or bore to any depth within the limits of a circle having a radius of $1\frac{1}{4}$ miles. Before application for a prospecting permit is made, the area for which the permit is required must be indicated by placing a peg in the ground, in the centre of the circle, having on it the class of mineral being prospected, the name of the individual or company for whom the permit is desired, and the date of insertion of the peg. Requests for permits should be made to the Chief of the district (*Circonscription Administrative*) within which the ground has been pegged. Each request must be accompanied by such detailed plans and particulars as shall enable the peg to be located and its geographical position accurately determined. On ascertaining that the request is in order the Chief of the Mines Department requires from the applicant the sum of 100 francs (£1), being the charge for a prospecting permit for the first year.

Prospecting permits are available for one year from their date of issue. This limit may be extended to a second or third year on further payments of 200 francs (£8) and 500 francs (£20) respectively,

The holder of a prospecting permit can obtain authorisation to dispose of the produce of his working on payment of an *ad valorem* duty of seven per cent.

The right to definitely work (*exploiter*) a claim can only be acquired by virtue of a working permit (*permis d'exploitation*). The holder of a prospecting permit may, at any time during the period in which it is valid, exchange it for a working permit. The area to be worked may not exceed 1,000 hectares (2,470 acres) nor be less than 200 hectares (49½ acres), in the form of a rectangle the smaller of whose sides measures not less than a quarter of the greater, the sides running north-south and east-west respectively. At least two-thirds of this rectangle must be within the limits of the prospecting area. The limits of the working area must be properly pegged off at intervals not exceeding one kilometer. A separate working permit is required to be taken out for each working area.

In making application for a working area—which should be to the Mining Commissioner for the district in which the required claim is situated—a detailed plan must be supplied of the area applied for, on a scale of 1 : 10,000, indicating the true north and also the exact position of the pegs. The nature of the minerals contained in the claim must be stated. The permit will not be granted if, through the fault of the parties concerned, the application be received after the expiry of the prospecting permit, or if the required conditions have not been fulfilled.

It is required that each permit holder should keep a register of production and of sale or despatch of the proceeds of his claim for each working and prospecting area, which shall be open at all times to the inspection of agents of the Mines Department. Each permit holder is further required to immediately notify to the Commissioner of Mines the existence of any reefs which may be discovered within the limits of his area.

Every working claim is subject to a fixed tax of seven per cent. of the value of the produce extracted. At the end of every three months, reckoning from the date of the delivery of the working permit (and with a delay not exceeding one month), the permit-holder must report to the local Mining Commissioner the output of each claim during the previous three months. It is on this basis that the Mining Commissioner computes the sum due for the previous quarter.

A person trading in gold, precious metals or precious stones, in their natural state, extracted from the ground in the Colony, is required to take out a licence for such trading, paying the tax for special class (*hors classe*). Holders of mining permits who sell the produce of their claims, and who have the permit to do so above referred to, are not, however, considered as trading in gold, precious metals or precious stones, and do not pay a trading licence. Provision is made in a new Law for prospecting and working permits issued under previous decrees.

Trout in Natal.

ESTIMATED ANNUAL INCREASE.

By J. C. PARKER.

It is maintained by those interested in the European salmon fisheries that not more than three out of every thousand salmon eggs produce fish that reach the breeding stage, owing to the heavy toll levied on the fry in the estuaries and the sea by birds, mainly sea gulls, seals, porpoises, and rapacious fish. As the common trout does not go to sea and has not to face such perils, I have taken as one of the factors of the calculation that ten out of every thousand trout may survive to breed—that is, one out of every hundred.

A trout will breed when three years old, when we may suppose it will weigh 1 lb., increasing $\frac{1}{2}$ lb. each year. For every pound weight 1,000 eggs are produced.

I have taken as an example the Mooi River, stocked in 1899 with 400 fry. We will suppose that half these died before they were three years old and that half of them were females. They begin breeding in 1902. The probable increase of trout in Mooi River will thus be:—

- 1902: 100 breeders of 1 lb. each give 100,000 eggs,
or 1,000 reaching maturity.
- 1903: 100 breeders of $1\frac{1}{2}$ lb. each give 150,000 eggs,
or 1,500 reaching maturity.
- 1904: 100 breeders of 2 lbs. each give 200,000 eggs.
or 2,000 reaching maturity.
- 1905: 100 breeders of 2 lbs. each, plus 500 of 1 lb. bred 1902, give 700,000 eggs,
or 7,000 reaching maturity.
- 1906: 500 breeders of $1\frac{1}{2}$ lb. each, plus 750 of 1 lb. bred 1903, give 1,500,000 eggs,
or 15,000 reaching maturity.
- 1907: 500 breeders of 2 lbs. each, plus 750 of $1\frac{1}{2}$ lb., plus 1,000 of 1 lb., give 3,125,000 eggs,
or 31,250 reaching maturity.

If the local fishermen catch three thousand every year—which is far more than is likely,—they practically make no impression on the ever increasing stock of trout. Nature must have some secret way of her own to check this increase.

Ostrich-Farming as a Paying Industry.

SEVERAL inquiries having been made lately of the Department of Agriculture relative to ostrich farming, it will not be inopportune at this stage to draw attention to the valuable chapter on Ostriches and Ostrich Farming in Prof. Wallace's work on "The Farming Industries of Cape Colony," published in 1896 by Messrs. P. S. King & Son. We believe copies of this work are now somewhat difficult to obtain; and a summary of the chapter in question will probably be found useful by readers interested in the subject of ostrich farming.

Ostrich farming in Natal is only on a very small scale at present—and has been so for a number of years—but there seems no reason why more farmers should not go in for it, as there appear to be many parts of Natal suitable for this branch of farming—*e.g.*, the Thorns and edge of the Thorn Country of the Colony. In the opinion of Mr. D. C. Slatter, who was interviewed in 1900 for this *Journal* by "Ergates," there is perhaps nothing in farming that pays better—and in this connection it must be borne in mind that the ostrich farmer does not rely on the local market. "Ostrich farming in the 'Thorn' country of Natal," Mr. Slatter said, "is a solid and

MOST PROFITABLE INDUSTRY:

there is no mistake about that. And it is a comfortable, easy-going occupation—just the thing for a man not wishing to be extravagant in the expenditure of energy. But the man must know how to do what is wanted, and his supervision should be constant."

Prof. Wallace says that ostriches do not thrive well under conditions of extreme cold or of heavy rainfall, and even on land suitable to them they soon do badly if overcrowded. On grass of strong growth, particularly that close to the coast-line on the sour veld where it becomes hard and indigestible, ostriches are not so successful as when fed on sweet Karroo bushes, although there are few parts in the Cape Colony where they cannot be kept. One advantage which a dusty bush-country possesses over a grass country lies in the feathers being preserved in better condition where the birds can take a dust bath than where they will roll about in early morning on the dewy grass.

They are fond of all sorts of bushes which sheep eat; and when the country is devastated by swarms of locusts, ostriches, like most animals, consume locusts, but they are not, as a rule, insect-feeders. They do not suffer from the attacks of ticks so much as four-footed animals, for they remove them from all parts of the body which they can reach with their bills, leaving only the head, upper neck, and under the thigh assailable.

There is stated to be no contagious disease from which ostriches suffer, although they are most susceptible, especially when young, to the attacks of internal parasites. These they pick up with their food from the veld, or take in with impure drinking water.

Young chicks feed at first on the solid excrement of the old birds; and they thrive particularly well when they have access to the residential quarters of the Kafir population. To supply a sufficient amount of bone-earth to satisfy the demands made on the system for material to form the skeleton, it is necessary in many parts of the country where phosphate of lime is deficient in the soil, to provide broken bones for the consumption of the birds, and on sour veld salt should also be given.

Ostriches do well when permitted to run over arable fields while out of cultivation, as they are fond of the numerous succulent weeds that are found in such places. Like pigs, they are particularly fond of arum lilies. Ostriches at any age will eat pumpkin pips, which, when taken in quantity, paralyze the limbs for a time.

During prolonged periods of drought, when the natural food becomes exhausted, it is necessary to supply the whole stock with some form of

SUCCULENT FOOD

to prevent their dying of starvation, or suffering from stop-sickness or constipation. The power of digestion of an ostrich is proverbial, even to the digestion of horse nails and pieces of wood, but this vigour need not be looked for unless the bird be in good health and living on suitable food. The succulent branches of the prickly pear or the leaves of the American aloe (agave), chopped into small pieces, serve the purpose admirably, and birds can be successfully carried through a period of scarcity on this food, supplemented by an allowance of 1 lb. of mealies daily.

In those districts where lucerne is extensively grown under irrigation, the ostrich farmer is independent of difficulties arising from climatic irregularities. Two hens and a cock can be kept during summer in a lucerne crop of less than half an acre, and are not able to consume the whole produce. Ostriches thrive admirably on green lucerne during the growing season, and in winter time on lucerne hay cut into short lengths, and well wetted the day before it is to be consumed. A daily allowance of 3½ lbs. of hay, when birds are running on bare veld, will keep them in good condition. Oat hay treated similarly is found to be constipating, but this defect would be easily remedied by showering the hay-chaff with treacle water from a rose can—a dressing which would also make the hay more palatable. Birds fed during a period of drought are liable to injure their feathers by rushing against each other. Chick ostriches at all times, and old birds when on dry food, require to be supplied with water; but the latter do not absolutely need to drink if they be feeding on green herbage. There ought to be no muddy dams in an ostrich camp, as the birds get into them in hot weather to roll, and thus destroy their feathers.

Ostriches require to be

ENCLOSED IN CAMPS.

Wire fences form by far the most available means to this desirable end, although, owing to their invisible nature, they are a serious source of danger to birds, until the latter become accustomed to them. A single wire fence of four or five wires (galvanised, in preference to annealed, so that they may be the more readily seen), five feet high, serves the purpose well, when birds are in camps on the veld, as the cocks soon find out which one is master, and the weaker ones keep out of his reach; but where birds are kept on lucerne on areas of less than an acre, it is necessary to place two fences a few feet apart from each other to divide the camps, so that the birds cannot get at each other.

On good Karroo-bush veld one bird should not be allowed less than 15 acres. Camps of 30 acres, or even 40 acres, for the accommodation of a pair of breeding birds, do very well, and it is most advantageous both to the veld and to the ostriches if some other description of stock be pastured on alternate years. The bushes which ostriches eat closely then get a chance of growing, and cattle, sheep, and goats keep down other bushes that tend to grow too rank. Moreover, some of the parasites which attack ostriches disappear or become reduced in numbers during the period that the birds are on other veld. Cattle do well when pastured throughout the season on the same veld with ostriches, but under similar circumstances sheep and goats thrive badly.

Although it is a common practice to put two hens with one cock, it is best to have a pair of birds together, if the cock be quiet. If he teases the hen mercilessly it is necessary to give him two, or even three, hens, to divide his attention and prevent him actually killing the one.

The hen ostrich lays from 12 to 17 eggs. When two or three dummy eggs are left in the nest, and the real eggs are regularly removed, a hen will lay as many as 30 before stopping. The period of incubation is six weeks, and the hen sits during the day, while the cock remains on guard in the vicinity, and takes her place at night. Some birds remain off the eggs only for a few minutes, while others will leave them to cool for an hour or more. At times the cock drives back the hen somewhat roughly to her domestic duties when it appears to him that she has been too long away. The eggs may become quite cold to the touch and not suffer in consequence; and when birds are not molested they usually bring out a chick for each egg, chipping the hard shells with their beaks at the proper time, to liberate those that have difficulty in escaping.

In well-managed camps, a proper place is prepared for

THE NEST.

after three or four eggs have been laid, by digging a hole 6 feet wide by 2 feet deep beside the original nest, and filling it with gravel, to secure

drainage in the event of heavy rains occurring while the birds are sitting. After the birds become familiar with the alterations, the eggs are moved on to the place prepared for them. Birds that are well fed and attended to may have as many as three nests in one year; and two nests are quite common.

After the hen commences to lay, the cock bird becomes unsafe to approach, unless one be armed with a long thorny mimosa branch which, on being held out in the line of his eyes, will stop the charge of the most savage birds. The hen, which throughout the early period of hatching remained quite harmless and safe to approach, becomes even more savage than the cock as soon as she hears the chicks chirp in the shell.

STAGES OF GROWTH.

Ostriches are spoken of as *chicks* as long as they retain their first feathers, *i.e.*, up to seven or eight months old. After this, until they are twelve months old, they are designated *young birds*. They are *plucking* or *feather birds* from one until they are four years old, and then they become *four* or *five-year-old birds*. At four years old they come to maturity, and are camped off for breeding.

The distinguishing characteristics of the different ages, which, however, do not follow an absolute rule in all birds, are quoted by Prof. Wallace from Douglass as follows:—

At *six and a half months old* the quill feathers will be ready to cut; some of the body feathers will have begun to change; some of the cocks will show yellow in the front of the legs.

At *a year old* the second growth of quill feathers should be showing; some of the cocks should begin to show black feathers; all cocks should show white on legs and bill.

At *two years old* all the chicken feathers should have gone from the back, and the cocks should show quite black, or nearly so. Most of the little white belly feathers should have been replaced by blacks or drabs, according to sex. (Exclusive of the white plumes, black is the mature colour of the male, and drab or dark grey that of the female and young male.)

At *three years old* there should not be a single chicken feather to be found on the body; the last place from which they disappear is where the neck joins the body. Every vestige of the white belly feathers has gone. The bird's plumage has reached perfection; some of the cocks will be red in front of the leg and on the bill.

At *four years old* the birds have reached maturity and the breeding organs are fully developed; the cocks in season will have the back sinews of the leg pink, the front of the leg and the bill scarlet, and much of the fineness of the feet, the leg, and the lines of the body will have gone.

At *five years old* and upwards the only distinguishing marks we know are a generally coarser look of the limbs and body, and an increased coarseness of the scaling in front of the legs and feet.

PLUCKING THE FEATHERS

of birds that run on natural veld is done for the first time when the bird is about seven months old, by clipping the quills when these have become dry, so that no blood will come, and at the same time the tail feathers and drabs, two rows of body feathers from the upper side of the wing, and two rows below it, are pulled. Two months later the stumps, then quite ripe for removal, are drawn by means of small forceps. Six months after the first drawing of stumps the second plucking takes place, followed by stump-extracting at the end of eight months, and so on, a crop of feathers being secured every eight months, or three crops in two years. The

RELATIVE VALUES OF THE PLUCKINGS

are as follows, although the actual figures fluctuate with the prices in the market. If the first crop be worth 4s to 6s, the second will fetch 15s to 20s, the third £1 5s to £2, and the fourth, which is the most valuable of all, £3 10s to £4. When birds are fed on rich food, as on lucerne, a crop of feathers may be got in seven months.

Cutting of both the tail and quill feathers is done at six months, and the stumps and short feathers are removed a month later. The high feeding tends to make the quills stronger, and as regards the finest plumes not worth so much per pound, but the quantity of produce is greater, and the total value per bird more. At Oudtshoorn 2 lbs. of blacks and drabs may be got from one plucking, while in the Eastern Province, where the system of management is not so intensive, the weight might probably not exceed 1½ lbs. from a bird.

Much can be done by way of improving the quality of a breeding stock of birds by careful selection of those of best form which produce the finest quality of feathers, and by discarding those that are inferior in those respects. At one time there was a run upon light-coloured hens, which possessed more white feathers than dark hens, without sufficient care being bestowed in selecting for quality of feather. It is now known that dark hens of good feather exercise a beneficial influence upon their male progeny, and quality has consequently taken precedence of lightness of colour. The cock must be depended upon to produce the best white plumes, as the gloss of the female feathers is not so good. It is also important to select birds descended from parents which have been successful breeders. Douglass says, in writing of the

POINTS TO TAKE INTO CONSIDERATION:

“They should have a well-developed, muscular frame, large feet, thick, powerful-looking legs, with great depth of girth, and a prominent bold

eye. On no account have anything to do with a herring-gutted, fly-away looking bird. A bird, if in good condition, should be broad across the back, with a furrow running down the middle. The tamer and more domesticated they are the better, but by tameness is not meant want of pugnacity. The body feathers should be curly, rich in colour, with a shiny gloss on them. The great complaint against Cape feathers is a want of fulness, closeness, and breadth of fluff of the lower part, as well as a want of width at the crown."

The

PRICES OF OSTRICH FEATHERS.

being dependent upon the whims of fashion, which is liable to change, must remain somewhat uncertain. This fact should lead a farmer to provide more than one string to his bow, and adopt ostrich farming as one branch of his industry, not as the sole means of livelihood.

Apart from this being a judicious and safe course to follow by a person desirous of eliminating from the business of his every-day life all excessive market fluctuations, which lead to the introduction of something not far removed from gambling, we have already seen that decided advantages result from the annual change of stock on the natural veld, and we may therefore conclude that the profit per bird will be greatest when ostriches do not exceed a certain, and not an excessive, proportion of the stock upon the farm.

Budding the Avocado.

THERE is a fair demand in this country for the avocado pear among those who have acquired the necessary taste for the fruit, and some attention could profitably be given to its cultivation by fruit-growers. Until the last five or six years it was thought that the avocado came true to seed, and attempts to propagate good varieties asexually were wanting or had failed. According to Mr. P. J. Wester, writing in the *Florida Agriculturist*, great credit is due to Prof. P. H. Rolfs, of Lake City, and Mr. George B. Cellon, Miami, Florida, who did the pioneer work in budding the avocado. As, in the early days of the orange industry, the budding of citrus fruits was thought to be very difficult, so the budding of the avocado was at first considered a complicated operation, but the difficulties are being rapidly cleared away as experience is accumulated, and as much as 75 per cent. of buds have been got to develop into trees.

The method of budding is the same as that employed in the budding of citrus fruits. There have been complaints that the buds do not take or that they do not start readily. This is stated to be due not to an inherent difficulty in the avocado to be budded, but rather to the inexperience of the performer, either in budding, or, more frequently, in the selection of bud-wood. Only large, well-developed buds should be inserted, and rather larger than citrus buds—certainly not less than three-fourths of an inch in length, and, preferably, one inch, as small buds are frequently grown over where the stock is in vigorous condition, as it should be. It has been found by experiment that tender wood is preferable to older wood, and even the soft and tender tops, inserted as sprig buds, have been used with perfect success. Where old and hardened wood is employed, the buds frequently drop, making a "blind bud." For wrapping the buds, waxcloth is preferable to string, as it affords the bud better protection from injury and water. The buds should be inserted in spring and early summer. Two weeks from the date of budding the buds have taken and the trees ready to lop. The trees should now be gone over every two weeks, the wild sprouts rubbed off, and, when the buds have made a growth of eight to twelve inches, the stock may be trimmed back to the bud.

The best material for grafting or budding tape is cheap cotton cloth which will tear easily. Rip up the cloth in strips of desired widths, say six or seven inches, and roll these tightly on stout iron wire as long as the width of the cotton strips. Several strips may be rolled on until the roll is one inch in diameter; tie a string around the roll at each end to prevent unrolling while being boiled in the wax. A good wax is made by boiling together two pounds of beeswax, two pounds of rosin, and one-half pound of good lard; when in boiling state put in the rolls of cloth and let them remain for fifteen minutes, when they are taken out and cooled off before being stored away. The iron wire is more desirable than sticks of wood, as the weight of the wire keeps the roll below the surface of the boiling mass. Another advantage in using the wire is that, if the wooden sticks are not quite dry, the water as it is converted into steam will cause the contents to boil over.

Anyone in possession of large, unproductive avocadoes can easily convert them into paying trees by cutting them down about three or four feet above ground and budding the sprouts, which soon make a start. For home use, any fruit of good quality will answer the purpose. In budding for a commercial orchard, it should be kept in mind that the very early and late varieties command the highest prices. Other desirable points are: prolificness; skin smooth, thick and leathery; good keeping qualities; the seeds filling the cavity, as a loose seed pounds the walls in transit, causing early decay; small seed.

The Home Preservation of Fruit.

SOME USEFUL HINTS.

THE proper preservation of fruit and vegetables for winter use is an important question for the farmer's wife, since she has, or should have, an abundance of fresh fruit and vegetables which, if properly preserved, would go far to reduce both the grocer's and the doctor's bills. The large canning establishments will, of course, always supply the demands of the population of the towns, but every farmer's wife can provide her own supply at a lower cost and at the same time know the true composition and purity of the goods.

In addition to supplying the wants of her immediate household circle, the demand in the towns for "home-made" jellies, fruit juices, and preserved fruits, especially for the sick, is always great; so that, by preparing a few jars over and above the requirements of her household, a source of income for the farmer's wife is provided. With the establishment and development of the Home Industries Society, a considerably larger field than hitherto existed is provided; and it may accordingly not be out of place here to refer to studies undertaken at the Wisconsin Experiment Station, U.S.A., in the direction of the preservation of fruit in the form of jams, jellies, etc. Mrs. L. H. Adams and Mr. E. P. Sandstein have embodied the results of their investigations in an interesting bulletin recently issued by the Station, giving a number of useful recipes. Dealing with the question of the condition of the fruit, they draw attention to the importance of fruit intended for canning being in the right stage of ripeness. This stage is difficult to describe, though in general it should be firm, having attained its full size and normal colour. It should be free from all kinds of blemishes, such as scab, rust, rot, and all forms of insect life. Fruit intended for canning in any way should be utilised as soon as possible after it is picked. If left standing for hours, even if the fruit is not over ripe, the fine flavour is lost and the keeping qualities are greatly impaired. When fruit is put up by the oven method, the authors' recommendation is that either the oven be covered with heavy asbestos paper and the jars likewise, or that the jars be placed in a dripping pan with a little cold water in the pan, placing a pan over the jars, as the fruit cooks faster in the top and may turn a little dark if not covered.

In making preserves, different fruits require different amounts of sugar; if a heavy syrup is wanted and no syrup gauge is at hand, use just enough water to liquify the sugar and heat very slowly, as sugar often crystallizes in the bottom of the jar if boiled rapidly, and the fruit will

not be sweet enough. In making syrup, when it begins to boil run a wet cloth carefully around the edge of the pan to take out the impurities in the sugar, leaving the syrup clear.

In considering the recipes contained in the bulletin, we may commence with the directions given for making jelly—which is described as “the most interesting and the most uncertain of any of the ways of caring for fruit.” Fruit for jelly is best gathered a little unripe; and if gathered after a heavy rain a greater amount of boiling will be required. Great care should be used in skimming jelly: the juice should not be stirred, but the scum skimmed off carefully. If allowed to boil over the jelly will not clear.

Before the jelly is put into the glasses, the latter should be sterilised, and they should be drained thoroughly as otherwise air bubbles are apt to appear in the jelly. When filling the glasses, fill each glass full before attempting to fill the next, as jelly will slide off in layers when turned out if put in a little at a time. Boil only a small amount of juice at one time, and use a shallow pan, as the water then evaporates faster allowing the juice to become converted into jelly in less time. Some people think that fruit that is not fit to can or preserve is all right for jelly, but this, we are told, is not so. Perfect fruit is more essential for jelly than any other way of treating fruit. Soft ripe fruit may be used for jams or marmalades.

It is stated that fruits such as strawberries, raspberries, peaches, which are not easily made into jelly, make beautiful jelly if one-third rhubarb juice is used, and the flavour is not harmed by such addition.

A new way to make plum and other jellies is described. This is to put fruit dry in jars (two-quart jars are good for this purpose), and place them either in the oven in asbestos paper or in a fruit steamer and cook until the fruit is tender. Then take out and strain through a flannel bag. Add as much sugar as juice and stir until the sugar is dissolved. Place on the back of the stove and heat slowly until it forms jelly drops on the spoon. During boiling skim carefully. It will take but a little boiling as this is pure juice. This process, it is remarked, produces the clearest and finest plum jelly.

Directions are then given for making various jellies and other fruit preserves, the most useful of which may be given here.

APPLE JELLY.

In making apple jelly, cut the apples into quarters. They should not be cored or peeled. Cover with water and cook till tender and then strain. Let stand an hour or more and strain through a flannel bag. Measure out the same amount of sugar as juice, and boil the juice fifteen minutes before putting in the sugar. Stir until the sugar is dissolved and boil slowly till it jellies in a spoon. Plum juice may be added if a plum

flavour is desired. Apple jelly often lacks a decided flavour and this can be enhanced by adding a small quantity of plum juice.

PLUM PRESERVES.

Plums are always nicer peeled, and it is easily done by placing the fruit in boiling water for a minute or two, then pouring on cold water. The skins will then slip off easily. If plums are canned with the skin on, either prick each plum with a needle or cut one side to the stone, so that they may remain whole.

CANNED PLUMS.

The most common way of canning plums to be used as sauce is to make a syrup by using pound for pound of fruit and sugar, or less sugar if not so rich a sauce is wanted. When the syrup is boiling add the fruit. Cook till tender, and carefully remove the fruit and place in jars. Fill up with syrup and seal.

PLUM MARMALADE.

Boil the fruit till tender and run through a sieve, add same amount of sugar as pulp and cook slowly till it thickens. This may be sealed in this state, or may be spiced and used with meats. One-half plum pulp and one-half crab apple pulp makes a better combination than all plum; or apples may be used instead of crab apples, but they do not give the firmness that the crab apple does.

STRAWBERRY PRESERVE.

It is very important that the berries be fresh and firm. For this reason they should be picked just before they are to be utilised. Carefully remove the stem, taking care not to bruise the fruit. If dirty, the berries should be washed before stemming. For preserves use as much granulated sugar as fruit. If for sauce, one-half to three-quarters the amount of sugar will be sufficient. Place a layer of sugar and then a layer of fruit. Let stand a half day or over night and can early in the morning. Take the juice and bring to boiling point, skimming carefully. Add the fruit and let all heat through and can hot. No water is used. By this method the berries will keep their colour and the preserves be richer.

It is stated that Chinese wood oil has come into great prominence in recent years as a varnish and paint oil, and has created a considerable amount of interest in America, Europe, and other parts of the world. The tree from whose fruit it is expressed is a native of the Yangtze and West River Valleys. The value (c.i.f.) in Europe and America has been placed at £35 per ton.

Native Hemp.

Mr. J. MEDLEY WOOD, the Director of the Natal Botanic Gardens, Durban, sends us a copy of a letter which he addressed many years ago to a local paper on the subject of our native hemp. In view of the attention which is now being given to fibre cultivation, Mr. Wood's communication will doubtless find many interested readers.

In forwarding the letter Mr. Medley Wood writes:—"After a lapse of almost exactly twenty years the matter of exploiting the native 'hemp' plant is again coming to the front; and as I have already had several enquiries about it, and as some persons are wishful to give the plant a trial, I send you a copy of a letter which I wrote to one of the local papers in October, 1887, thinking that though somewhat antiquated it may still be found of use. I see nothing in it that requires serious alteration. The only addition that it occurs to me to make is to warn intending planters against using imported seed, the plants from which may, or may not, yield fibre of the same excellent quality as that obtained from our native variety."

The following is the letter referred to:—

Enquiries having been made lately about this plant, the following information may perhaps be useful:—

A number of specimens of fibre were sent from Natal to the Colonial and Indian Exhibition, and amongst them was one labelled "Hibiscus." This sample was examined by experts at Home, and was said to be one of the best, if not the best, fibre in the Exhibition; but they questioned the fact of its being obtained from an Hibiscus. A small sample of it was returned to me, to try to ascertain from what plant it had been manufactured, and, after some enquiry, it appeared certain that the labels had unfortunately been misplaced, and that the fibre in question had been sent by Dr. Sutherland and called by him "Native Hemp," the plant from which it had been prepared being the one known by the natives as *Insangu*, used by them for smoking. This plant is a species of *Cannabis*, but whether a different species to the one cultivated and yielding the ordinary "hemp" of commerce, or not, seems as yet somewhat uncertain. Specimens of the dried plant sent by me to Kew have been examined there and found not to differ botanically from the common *Cannabis sativa*, but it is worth notice that we find here that the seeds differ both in colour and size from those of common hemp, and the natives who so eagerly collect the indigenous plant for smoking will not use, or do not like, the imported plant, which they say is very much stronger than the one they have been accustomed to use. Some three years ago Messrs. McCubbin, of Durban, imported seed of "Chilian" hemp, the true *Cannabis*

sativa, which was distributed amongst various farmers and others. Some was planted and came to maturity in the Gardens, but the plants did not attain the size they should have done, and most of them flowered at from one to two feet high—and this, I believe, was the experience of others to whom the seed was sent—while the native kind grows vigorously and attains a height of six or more feet, according to the soil and situation in which it is found. I therefore strongly advise those interested in this matter to collect the seed as largely as possible during the present season, or to obtain small supplies at once and plant so as to save seed for next season's sowing. It must be understood that in sowing plants for the crop of seed, they may stand widely apart, but if it is intended to utilise the fibre they should stand thickly on the ground so as to produce long unbranched stems, which alone are valuable for fibre.

I have also been asked as to what process is necessary for preparing the fibre for market and what machinery is required for the purpose. I am sorry I have no information as to any recent improvements or improved machines, if there be such, for the purpose. The old fashioned way which may be and probably is still in use, is by what is called "retting" the stalks, and there are three ways of doing so, called respectively "water retting," "dew retting," and "mixed retting."

"Water retting" is steeping the stems in either running or stagnant water, when fermentation ensues, which must be stopped by taking them out and drying them before putrefaction commences, the time required being five to ten days. In Europe, sometimes a much longer period than this is necessary, as much depends on the temperature of the water.

"Dew retting" is accomplished by spreading the stems out upon the grass and turning them over from time to time, until the fibre is ready to separate from the wood.

"Mixed retting," which may be found the most preferable plan for Natal planters, consists in steeping the stems, either when freshly cut or after a day or two's exposure upon the grass, in water, until the acetous fermentation is complete, and then spreading them thinly upon the grass as in "dew retting," turning them occasionally until the process is complete.

In whichever way the stems may have been treated, all that is necessary afterwards is to free them from the woody portion of the stem, which is done by a small hand machine called a "brake" and consists of a grooved block to which is attached by a pivot a wooden "sword," also grooved on its lower surface. Between these two the stalks are passed, while the "sword" is worked up and down by hand; this breaks up the woody portion of the stem, so that it may be readily separated from the fibrous portion, which is then ready for packing. There are no doubt other and comparatively inexpensive machines which accomplish the same object more rapidly, but I have no recent information about them.

As to the yield per acre, I find on reference to the Official Handbook of the C. and I. Exhibition that the crop of green stems is said to be about sixteen tons per acre, of which twelve are lost in drying. "The residue consists of soluble matter, woody and other refuse products three and a half tons, and clean marketable staple half a ton." The same pamphlet states that it has been classed with the best Italian sorts and worth £23 per ton.

Since that pamphlet was written the sample sent by Dr. Sutherland has been further examined and tested by experts, and is now valued at £50 per ton, and my correspondents at Home say that there will be a large demand for it if it can be produced in quantity.

A small sample of the raw material and also of the same fibre bleached and dyed may be seen at my office.

Melilot Lucerne.

MR. B. HARRISON, Burringbar, Tweed River, New South Wales, has sent to the Department of Agriculture a sample packet of seed of melilot lucerne (*Melilotus dentatus*), together with a description of the plant. He writes:—

"This is one of the best fodder plants in Australia, which as yet is but little known. It is stated that it grows profusely, and yields an abundant supply of the most palatable fodder on an island off the coast of Tasmania. It attains a height of 5 and 6 feet, has a shamrock or clover-shaped leaf and small yellow flowers. It has a strong coumarin flavour like newly mown hay, especially when seeding, and it is eaten greedily by horses, cattle, sheep, and pigs; and bees are very fond of it as it is very rich in honey. This plant is very rich in nitrogen and quickly enriches land on which it is grown. It grows well in the poorest soil, is triennial, and maintains itself easily when established, and it has proved a wonderful fodder plant. A farmer in Victoria has tried it with great success on his horses, and another, who has 100 acres of it, says he finds he can keep more stock on it than on a similar area of ordinary lucerne—*Medicago sativa*—and it also makes first-class ensilage.

"A few years ago this island was a desolate place occupied by a few fishermen and woodcutters, etc. A syndicate leased it for cattle raising,

and in consequence of a poisonous plant growing there among the grasses the cattle died off, and it was abandoned. Later on a vessel was wrecked on the coast, and among the wreckage washed ashore were some mattresses filled with fibre containing seed. As this decayed the said plant grew and overspread the island. Now the island has a population of 600 souls, and exports weekly 50 head of fat cattle. It is said that melilot has in the course of a few years changed poor sand dunes into dark, almost black, loam. Through its adaptability to grow and yield heavily on poor soil, this plant should prove a great boon to stock-breeders, and within a few years should become world-renowned."

Mr. E. R. Sawyer (Director, Experiment Stations), furnishes the following note on melilot:—

"There are several species of melilot in cultivation, all of which contain *cumarin*, which gives them the pleasant odour of new mown meadow hay. When mixed with grass hay they increase its fragrance. *Melilotus alba* and *leucantha* both bear the name of Bokhara clover; the former is called sweet clover in the United States. *M. altissima* is known as Hungarian melilot. *M. coerulea*, the blue or sweet melilot, according to Muller, "forms an ingredient of the green Swiss cheese, which owes its flavour and colour chiefly to this plant."

"Both the Blue Melilot and Bokhara Clover have been successfully cultivated at Cedara, and a considerable acreage of the latter is being grown during the present season both as a seed crop and for green manure. The Blue Melilot made very fine growth in 1904-5, and remained green far into the winter. It produced seed at the rate of 238 lb. per acre and more than three tons of hay. The growth was rapid, the plants were succulent, and the stems remained tender up to the latest stages. It seemed to be one of the most promising of the legumes for our soil and climate, but in 1905-6 grew very poorly and was very disappointing.

"Bokhara Clover has done very well for two years in succession, growing more slowly than the Blue Melilot, but eventually reaching a height of 4 feet to 4½ feet. It has, however, to be cut for hay or forage before attaining that height, as the stems become woody. The plants remained green quite late into the winter and seemed but little affected by frost and drought. In America, Wilson and Smith say: 'If sown in spring a crop may be cut in fall and two or three crops the following season. For hay it should be cut when about 18 inches to 20 inches high. If the same land is to be kept in sweet clover for more than two years, only two crops should be cut for hay each season and the third allowed to form seed.' Stock do not like it at first, but eat it greedily when they have acquired the taste. Bokhara Clover is regarded in America and elsewhere as one of the best green manures.

"The variety *M. dentatus* has not hitherto been tried at Cedara, but is being investigated during the present season."

Other Uses for Lime.

By ALEX. PARDY, F.C.S., etc., Analyst.

A CORRESPONDENT has suggested that since Natal is capable of producing, cheaply, a very good lime, there may be other profitable outlets open to it besides its use in agriculture and for building purposes. Citrate of lime and calcium cyanamide were cited as two instances in which it was employed in the process of manufacture, and it was thought desirable to consider how well we were equipped otherwise for the carrying on of such industries.

The suggestions are well worthy of at least thoughtful regard, as we have at hand all the raw materials necessary for their production; but it remains to be seen how, from a business point of view, each may be made to fulfil the requirements of a paying venture. The lime certainly is to hand in large quantities, but it is perhaps the least to be considered from a financial position. Lemons, limes and oranges are, or can be, grown readily; nitrogen of the air is as unlimited here as on the Continent; we have the water power to generate the electric current; and so are favourably situated in each respect. There are, however, many difficulties in the way in regard to the second industry which have yet to be overcome, as in all initial enterprises many modifications have to be introduced before anything like a harmonious and perfected system is possible. This new industry is in its infancy, and it may be wiser to patiently await the results of those who by their position are better able to lead the way in placing it on a workable and efficient basis. A brief outline of the various processes may, however, lead to a more ready apprehension of the simplicity of the one and the difficulties which have to be overcome in the other.

CITRATE OF LIME.

Citric acid occurs in the free state in the juice of many fruits and is found in comparatively large quantities in the citrus fruits, the lemon and lime being the two principal from which the acid is obtained. The juice from the peeled and seeded fruits, after being squeezed out from these by means of rollers or strongly made presses, is either clarified and then heated to about 100 degs. C. in suitable vessels—usually of copper—or directly heated to this temperature to effect the coagulation and precipitation of the albuminoid matter and prepare it for the addition of the combining agent. To the hot juice, powdered whiting, chalk or carbonate of lime is next added till effervescence ceases. The acid is thereby neutralised; and on standing the insoluble citrate of lime settles out from

the treated juices. The supernatant liquid is then run off and the residue is repeatedly washed with warm water and then dried.

This residue consists of impure calcium citrate, and in this form is sold as a commercial article. Citric acid is obtained from the lime salt by adding to it the required amount of hot sulphuric acid, whereby the lime is caused to combine with the added acid to form sulphate of lime and set free the citric acid, which is run off in the overlying liquid after the heavy sulphate has settled out. Both citrate of lime and citric acid attract water on exposure, and in the moist state are subject to decomposition, so that considerable care is required in the drying and packing.

Citric acid is used for various purposes. It is largely employed as a "resistant" in calico printing, in the manufacture of aerated waters, and medicinally; and has a considerable commercial value dependent on its quality and purity. The normal price for calcium citrate appears to be about £40 or £50 per ton, but the price fluctuates, and much higher prices have been obtained.

CALCIUM CYANAMIDE.

Now, a commercial product of some considerable importance is one of the recently introduced nitrogenous manures, and is one result of the search after a fertilizer which may take the place of nitrate of soda. It has more and more been borne in on the minds of men that, as the possibility of a cessation of the world's supply through the exhaustion of the nitrate deposits is within measurable distance, and as this is a fact of such direct and vital importance to mankind, scientists must look to other directions for the production of a substitute which will effectively fulfil the purposes discharged by the natural resources of which we have so long had the advantage.

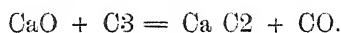
The two chief nitrogenous manures which have been and are at the present time being turned out are nitrate of soda and sulphate of ammonia. Neither the output nor the consumption of the latter has been as great as that of the nitrate, yet it is an article of very considerable importance. Its supply, however, is influenced by manufacturing conditions which have a natural tendency to limit its production. It has been estimated that the entire yield of this material was in the year 1905 between 500,000 and 600,000 tons, whereas the consumption of Chili nitrate (nitrate of soda) in the same year was 1,567,000 tons,* of which amount about 1,267,000 tons was used for manurial purposes and the balance in manufactories. Hence it will be seen that an enormous amount of nitrogen is required to supply the annual agricultural and trade requirements of the world.

Approximately, four-fifths of the atmosphere is composed of free nitrogen; and it is becoming more evident that it is to this vast source

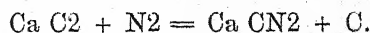
* Jour. Chem. Ind. No. 12, Vol. 25.

that we will have to look for our future supplies. In its free gaseous state, as it occurs in the atmosphere, it is of no direct value as a food material of plants, and has to be fixed or brought into combination with other elements before it can acquire this property. It is possible to produce many such compounds in the laboratory by inclusion of the free nitrogen, but few of them fulfil the requirements of a commercially produceable article, the cost and intricacies of their manufacture being too great for practical application.

One of the most successful attempts, and one which has already been found capable of producing a useful and fairly cheap article, is that of the preparation of a lime salt known as calcium cyanamide, containing from 15 to 20 per cent. of nitrogen—nitrate of soda contains from 15 to 16 per cent. Its manufacture in the first case involves the presence of calcium carbide, such as is used in the generation of acetylene gas for lighting purposes. This latter material is prepared where an inexpensive source of power is available—such as water power or cheap coal,—by passing a mixture of powdered quicklime and coke or coal dust between the poles of an electric arc whereby it is fused into a compound containing calcium and carbon, according to the equation,



This material forms a basis for further conversion into the nitrogen salt. When heated to a high temperature in a current of air, combination with the nitrogen of the atmosphere takes place in such a manner that a material containing calcium, carbon and nitrogen according to the following equation is formed:—



When this salt is heated with water under pressure, ammonia is set free; and it has been found that a similar effect is gradually produced when it is placed in contact with moist soil, the ammonia becoming ultimately nitrified.

In some experimental trials it has given results equal to sulphate of ammonia or nitrate of soda, but definite determinations are yet forthcoming before judgment can be finally given. As a top dressing it has been found to be rather injurious in some cases, and also when applied along with the seed in peaty soils a similar effect has also been observed. When applied two or three months previous to sowing the seed, no injurious result occurred.

The nitrogen in nitrate of soda costs in Natal 15s. 10d. per unit, in sulphate of ammonia 15s. 6d., and, according to a trial shipment, that in calcium cyanamide 17s. 10d. per unit.

CALCIUM NITRATE.

This is yet another suitable form in which the nitrogen may be fixed. It is produced by the direct combination of the nitrogen and oxygen of the air by means of electricity. In the producer air is passed into a specially constructed electric furnace in which it is heated to a very high temperature under the influence of an electric arc spread out into a disc-like shape by the action of powerful electro-magnets. A high temperature becomes necessary to increase the efficiency and velocity of the reaction which goes on under these conditions, viz., the formation of oxides of nitrogen. The gases so formed are rapidly cooled, either by sweeping the gases along or interrupting the arcs at minute intervals in order to prevent a reversion of the first reaction.

The gases obtained in this way, and containing from 1 to 2 per cent. of nitric oxide, are conveyed into a series of towers in which they are condensed in water, which becomes more concentrated after each addition of the gas. The gaseous products are hence led into an alkaline solution, such as milk of lime, whereby calcium nitrate is formed. By subsequent treatment with nitric acid this is converted into nitrate of lime. Sodium may be used in place of the lime, but as the latter, is the cheaper material, and produces a better fertilizer, it is more largely used.

This lime compound, although still scarce and difficult to procure in quantity, has been subjected to trials with various crops and has been found as efficacious as nitrate of soda, having, at the same time, a peculiarity due to the difference in the base.

Calcium nitrate has not yet made its appearance in the open market; and, as it has very substantial merits, it may be inferred that the process of its manufacture has been found to be rather an expensive one, but there is every prospect that this may be modified sufficiently to warrant an extensive output in the future.

Other modes of producing a nitrogen salt are undergoing experiment, the outcome of which may be the production of an effective article at a price below or not greater than that of nitrate of soda.

In both the above processes the chief condition involved appears to be a cheap supply of motive power, and this naturally points to cheap fuel or the harnessing of such a force as that supplied by a natural waterfall. The raw materials are in both cases either inexpensive or, as in the case of the nitrogen and oxygen of the air, free and unlimited.

The technique of the various processes must undergo many modifications before a perfect system is evolved; but, granted a satisfactory and effective process involving the use of the materials and forces outlined in the above sketch, it may be that we are equally favoured in some respects as, if not more so than, the present home of the new products.

Importation of Plants.

CHARGES FOR EXAMINATION, ETC.

A SCALE of charges which will be levied in connection with the examination, passing, and treatment of all consignments of plants entering Natal otherwise than by post, has been drawn up, with the approval of the Minister of Agriculture. It runs as follows:—

1. An examining fee of 2s. per 1,000 or part thereof shall be levied in respect to every consignment of plant cuttings and stocks (that is young rooted plants intended for the purpose of grafting or budding), a maximum charge of 5s. being fixed in respect to any one consignment.

2. Other than as specified in Clause 1, an examination fee of 2s. per 100 or part thereof shall be levied in respect to every consignment of fruit trees, fruit, plants, and bulbs, a maximum charge of 5s. being fixed in respect to any one consignment.

3. A passing fee of 1s. shall be levied upon all consignments passed without examination.

4. A charge of 12s. shall be levied for the use of the large fumigation house for the fumigation of each consignment of fruits and plants.

5. A charge of 5s. shall be levied for the use of the small fumigation chamber for the fumigation of each consignment of fruits and plants.

6. The examining officer shall issue a receipt in the form set forth in the schedule hereto for any fee levied and paid. Postage or revenue stamps representing the amount of the fee shall be affixed to the carbon copy of the receipt to be filed for record.

7. All labour and appliances, excepting such as are connected with the charging of the chamber with the insecticidal gas, are to be supplied by or at the expense of the consignee or his agents, and any damage to the fumigation house shall be made good by the consignee.

8. All charges are to be paid before the certificate provided for in Regulation No. 6 of the Regulations published under Government Notice No. 449, 1906, is issued.

9. Before the removal of any consignment, the certificate and receipt must be presented to the Customs Office for examination.

SCHEDULE.

The following is the schedule referred to in Section 6:—

O.H.M.S.

No.

PLANT DISEASES ACT.

Received from the sum of
 being
 Examining fee
 Passing fee
 Fumigation charge for use of large / small chamber

Inspector, P.D.A.

RHODESIAN REGULATIONS.

The Rhodesian Government Notice No. 157, 1907, has been cancelled and the following substituted in lieu thereof:—

“Until further notice no person shall introduce into Southern Rhodesia from the area of Cape Colony, lying east of and including the Divisions of George, Oudtshoorn, Uniondale, Willowmore, Aberdeen, Murraysburg, Richmond, Britstown, Hope Town, Herbert and Kimberley, any nursery stock, ornamental plants and shrubs, fruit or portions thereof, save as is in the next succeeding paragraph provided.

“Any consignment of farm produce (which term shall include articles of consumption grown on a farm other than produce of a vine) may be introduced if accompanied by a certificate of a Magistrate or a Justice of the Peace of the district in which it is produced to the effect that such production was outside a radius of one quarter of a mile from any vine, virginian creeper or plant belonging to the family *vitaceae*.

“If at any time an Inspector shall find any tree, plant, fruit, vegetable, or portion thereof introduced into this Territory in contravention of this regulation he shall order the same to be immediately removed from the Territory, or the Secretary for Agriculture may order the same to be destroyed without delay.

“All permits for the introduction of nursery stock from the aforesaid areas which have been granted under Section 16 of Government Notice No. 141 of 1906 shall be and are hereby withdrawn.”

TRANSVAAL REGULATIONS.

The Minister of Agriculture has been advised by the Director of Agriculture of the Transvaal relative to prohibitions and restrictions which are now in force in respect to the importation of certain produce from Oudtshoorn and the Eastern Province of Cape Colony into the Transvaal. The importation of vines and living portions of the vine—such as grapes, raisins (S.A.P.), dried currants (S.A.P.),

and nursery stock—and ornamental plants and shrubs, is prohibited. The following produce will only be admitted into the Transvaal if accompanied by a certificate of a Magistrate or Justice of the Peace of the District in which it is produced to the effect that such production was outside a radius of a quarter of a mile from any vine, Virginia creeper or plants belonging to the family *Vitaceae*: Acorns, S.A.; almonds; asparagus; bamboos; barley; beans; buckwheat; cereals; chaff; chicory roots, S.A.; currants; *dagga*; firewood, S.A.; flax; cut flowers; fodder; forage; S.A. forage; hay and straw; S.A. fresh and dried fruit; S.A. fruit pulp; hay; S.A. hops; maize; manioc, S.A.; manna hay and grasses; mealies; millet; moss litter; mustard; *myouti* grain; nuts, food-stuff, S.A.; oats and oat hay; olives; S.A. onions; peas; split peas; S.A. potatoes; reeds; rye; lucerne; lucerne hay and sunflower seeds; straw; S.A. sunflower seeds; tamarinds; tares; S.A. tobacco; lentils; linseed and linseed meal; fresh vegetables, S.A.; wheat; grain not otherwise mentioned; and all other produce not included in either the first list (vines and living portions of the vine, etc.) or the following one of articles of produce not prohibited. The following may be admitted: canned or bottled fruits, jams, jellies and marmalade; oils and oil-seed meals; bran, pollard, hominy, samp, meal, maizena; mealie cobs; pea-flour; live stock; meats, fresh and preserved, including bacon and ham; lard and lard oil, margarine and tallow; hides and leather; groats; milk; butter; cheese and eggs; ostrich feathers; pickles; sugar, golden syrup and honey; vinegar, wine, brandy, stout, rum (if casks, bottles, etc., are properly sterilised and duly certified in accordance with the regulations); malt; and lemon squash and syrup.

In New York there is an Apple Consumers' League, organised to promote the apple-eating habit. It costs nothing to join, and there is no constitution to tie members down. "You just agree," says the *Rural New-Yorker*, "to eat at least two apples every day and to call for apple in some form whenever you eat at any public table. If the proprietor doesn't serve apple you agree to find fault with him for not doing so. Every member is president, with headquarters in every member's mouth. That is all there is to it, but this simple unorganised work of apple eaters has, we firmly believe, increased the consumption of apples by at least 20 per cent. Our aim is to make apple-eating fashionable, and also to teach people that it is more patriotic to eat the true American fruit than to use imported oranges or bananas."

Export of Mealies.

SOME ENGLISH VIEWS.

A COPY of a letter written by a well-known firm of brokers in Southampton to Messrs. Donald Currie & Co., Ltd., London, relative to South African maize exportation, has been received. The writers have some interesting comments to make on the subject, and their letter should be read with interest by all South African exporters of mealies. The letter runs as follows:—

“We have had two or three lots of this (Cape) maize, and the last little parcel of 50 tons was *white* maize, and we think this variety should command a fair sale both here and in London. Maize of this particular quality and colour we think would generally become popular with makers of proprietary articles used for human food and for brewing. It is a little difficult to say what its relative value would be with maize of somewhat similar character grown in the United States and the Argentine; but we think commercially it would always hold its own with similar maize from these countries.

“The yellow description, which we have also imported, would be in more direct competition with yellow maize from Argentine, America, Russia, Roumania and North African countries, and also occasionally with maize from India. We hardly think this yellow maize would be considered as valuable as that usually grown in Russia, but it should be somewhat on a par with the maize grown in the North African States and that usually obtained from the Argentine. It would be used here for cattle feeding, but not so much for the proprietary articles and manufacture of products used for brewing. If it were found that Cape growers could produce yellow maize to more profitable advantage than white, then we imagine they should turn their attention to obtaining, if possible, a maize smaller in berry than their yellow maize appears to be, and it might be worth while to experiment with seed maize from some of the European countries which produce the finer and smaller varieties. Of these descriptions perhaps the more valuable would be the yellow maize known as “Cinquantino” or “Bessarabian,” and if this would not acclimatise in South Africa, they might try maize grown in India. We could not venture an opinion as to whether the more valuable descriptions of maize would answer in South Africa, or whether they would crop as well as the larger variety, but at present they command more money than the larger yellow sorts.

“With regard to prices, maize, like wheat, is subject to very consider-

able market fluctuations. With maize growing countries producing large crops, the price naturally must go down, and correspondingly with partial or sometimes almost entire crop failures in one or several of the maize producing countries, the price advances. At the time of writing we regard maize as high in figure, it being worth 24s. to 24s. 6d. per 480 lbs. at Southampton to first hand importers, and merchants are selling here to-day to their customers at 25s. to 25s. 3d. per 480 lbs., the difference being profit and expenses. We give you with this the relative prices that have obtained for maize in the corresponding month for the last five years, which will give some idea of values. Should the import grow rapidly for the white description, then the price of this would be very little over that obtained for the yellow, as after manufacturers of proprietary articles were satisfied (who would, we think, give a preference to have this maize), it would come in direct competition for cattle feeding, and we do not think it would command a higher price for this purpose. . . .

"With regard to carrying this maize, the manner in which the 50 tons arrived and was bagged was quite satisfactory. If sewn in strong bags there should be practically no loss whatever in transit, and consequently no allowances for loose collected maize and sweepings.

"We find with old crop maize from most countries there is a good deal of difficulty and depreciation in value owing to the attack of weevil, a most destructive insect which plays havoc with maize. This is probably well known in South Africa. There is very little trouble with new corn, but if it is stored in large bulk and weevil get into it, they do very considerable damage in a short time."

A cow belonging to John Blackburn, of Pennsylvania, U.S.A., was taken sick and died. A *post-mortem* brought to light the following causes: 38 nails (from lath nails to spikes), one corset steel, 9 collar buttons, 3 glove fasteners, 7 screws, one lead bullet, one empty shell, one silver watch chain, one suspender buckle, and ten feet of fine wire in coil.

A simple method of testing the genuineness of salts sold as nitrate of soda is to take a little—say a dessert spoonful—of the nitrate and place it on a small, perfectly clean shovel, and then put the same over an ordinary fire, with the bottom of the shovel directly upon or very close to the fire. If the mass melts readily in all probability it is nitrate of soda. If it does not melt it is some other salt. If it crackles without fusing or melting it is probably common salt.

Agriculture in the United States.

CONDITIONS IN 1906.

"ECONOMIC revolution in the science and art of agriculture, which became noticeable in this country half a dozen years ago, has continued during 1906, with tremendous effect upon the nation's prosperity. Crops so large as to be beyond any rational comprehension have strained the freight-carrying ability of railroads. Directly and indirectly the farmer has set up a demand for iron and steel that has exceeded the productive power of the chief producer among nations. His contribution to the supply of loan capital has been beyond calculation and recalls the fact that the depression in the loan and investment market of 1903 was cleared away by the following crop. Meanwhile the farmer has been a generous consumer, and has given powerful support to the market of the industrial producer, to the trade of the merchant, and to the wages of the working man."

A condition of things betokening a national strength and general welfare is portrayed in these sentences, taken from the last Annual Report of the United States Secretary for Agriculture. In that great country almost an ideal state of affairs seems to have been reached—a state towards a similar realisation of which South Africa, having awoken from decades of *laissez-faire*, is now earnestly striving—namely, a quickening of the pulses of national activity by a large circulation of wealth obtained from the soil.

A good idea of the progress America is making, agriculturally, can be obtained from a perusal of the Annual Reports of the U.S. Department of Agriculture for the year 1906. Taken at that point in production at which they acquire commercial value, the farm products of the year, estimated for every detail presented by the census, had a farm value of £1,415,416,666. This is £101,041,666 above the value of 1905, £132,291,666 above 1904, and £182,708,333 above 1903. A simple series of index numbers shows the progressive movement of wealth production by the farmer. The value of the products of 1899 being taken at 100, the value for 1903 stands at 125, for 1904 at 131, for 1905 at 134, and for 1906 at 144. An examination of the items of the grand total of wealth produced shows that most of the increase over 1905 is due to horses and meat animals. Crops, in a general balance of gain against loss in value, in comparison with the crops of 1905, made a fairly substantial gain—£4,583,333; so that the previous record year in the value of products,

1905, was exceeded by 1906 in both crops and animal products, and thus the latter year became the leading one in value of farm products in the history of the country by £101,041,666 over 1905.

Taking the chief crops in order of value, we find that by far the most valuable crop in 1906 was maize, reaching 2,881,000,000 bushels, of a value of £229,166,666. The cotton crop, fibre and seed combined, follows maize in order of value, although it was only three-fifths the value of the maize crop. In Texas alone the cotton crop is greater than that of British India and nearly three times that of Egypt, and it is half as much again as the crop of the world, outside of the United States, India and Egypt. Hay approached £125,100,000 in value. Wheat came next, followed, in order of value, by oats, potatoes, barley, tobacco, sugar (beet), flax seed, rice, rye, and hops.

The exports of farm products amounted in value to 976,000,000 dols. (equivalent to over £203,300,000) during the year ended 30th June, 1906. This is said to be the largest amount ever reached by agricultural exports from the United States or any other country, and exceeded by 24,000,000 dols. the exports of 1901, which had previously been the record year. Cotton maintains its long lead over other chief exports, with a value of 401,000,000 dols.

The so-called balance of trade in the international exchange of agricultural commodities continues to run in favour of the United States by an enormous amount; for 1906 the agricultural exports exceeded similar imports by 433,000,000 dols.

"Farmers are using their new capital to abolish the waste places of the land," says the Secretary for Agriculture in his Report. "The river is leveed and alluvial bottoms subject to overflow become worth hundreds of dollars per acre for vegetables; a marsh is drained by ditches and tiles and celery makes it the most valuable land in the country; semiarid land is constantly cultivated so as to make a mulch of finely pulverised earth on the surface, and the crops that it will grow make the farmer prosperous; durum wheat or alfalfa [lucerne] is introduced and again the semiarid wastes are made to do the will of the cultivator; leguminous plants give humus and nitrogen to the sandy waste, to the use and profit of the farmer; the unused rocky, stony field or mountain side, offensive both to the economic and to the aesthetic eye, blossoms with the apple, the peach, the pear, and the plum, and adds to the evidences that every square foot of the land may be made productive unless it is arid; and even then irrigation works, as far as water is available, swell the evidence. Along all of these lines of production farmers are using their newly acquired capital and are progressing as never before in their prosperity. . . .

"The farmer's standard of living is rising higher and higher. The common things of his farm go to the city to become luxuries. He is becoming a traveller; and he has his telephone and his daily mail and

newspaper. His life is healthful to body and sane to mind, and the noise and fever of the city have not become the craving of his nerves, nor his ideal of the everyday pleasures of life. A new dignity has come to agriculture, along with its economic strength; and the farmer has a new horizon far back of that of his prairie and his mountains, which is more promising than the sky-line of the city."

Agricultural Machinery.

A NEW BINDER.

A RADICAL modification in binder construction has, we learn from the *Implement and Machinery Review*, been carried out by Mr. Samuel Millar, a practical farmer of Otago, New Zealand, who is said to have spent four years evolving a new type of harvester.

The main features claimed for the new harvester are that there are no canvases (in itself a great saving), and there is not a clog on the machine. The crop is cut, conveyed to the binder, and tied and discharged—all on the vertical. The machine has neither spur wheel nor chain, and is simplicity itself. The driver works the entire contrivance without having to move from his seat. It has been found to act to perfection in short crops, and especially in rye grass, and it is claimed that it will cut and tie anything from 6 inches in height upwards. The ordinary harvester weighs from 16 cwt. to 1 ton, but Mr. Millar's patent weighs only 9 cwt., and will probably be made considerably lighter. It is stated that two horses are able to draw it without strain for eight hours, which is a vast improvement on existing conditions. The yoke—itsself a valuable invention—is on the pulley system, and so arranged that each horse is made to do its fair share of pulling. The main drive wheel is 4 ft. 6 in., but can be geared up to any requirement; and the raising or lowering of the cutters is regulated by means of a lever manipulated, like everything else, by the driver from his seat. The knotter is another remarkable patent connected with this machine. It is much simplified, and has no bevel wheels to get out of gear.

This harvest-binder has come through many preliminary trials successfully, and is to be put through sundry other exhaustive tests during the next harvest.

A company with a capital of £6,000 in 240 shares of £25 each has recently been registered to acquire the patent.

Tobacco International Exhibition.

A COMPETITION FOR COLONIAL LEAF.

WE print below a letter which has been received by Mr. E. R. Sawyer, Director of Experiment Stations, relative to a proposed open competition for Colonial leaf, to be held in conjunction with the Fourth International Tobacco Trade Exhibition next March. Awards are to be made for tobacco leaf grown in British Colonies, and the Empire generally, including Cape Colony, Transvaal, Rhodesia, Natal, Sierra Leone, British Honduras, Zanzibar, Trinidad, Jamaica, Fiji Islands, Straits Settlements, Bermuda, India, Ceylon, Canada, British Columbia, Australia, New Zealand, British North Borneo, Cyprus, Malay States, and Ireland,—the judges consisting of well-known London tobacco brokers and manufacturers.

The letter runs as follows:—

“A correspondence has appeared in several London newspapers expressing regret that Colonial-grown leaf tobacco was not more in evidence at the Tobacco Exhibition held at the Royal Horticultural Hall, Westminster, last April. It is true that the Government of British Columbia had an important exhibit which excited much interest, but apart from this there was very little Colonial-grown tobacco shown.

“The Management of the Tobacco International Exhibition have decided, in view of the obvious interest of the public and the trade in tobacco, which it is thought might be grown more extensively in several British Colonies, and in view of the higher prices which have been demanded for the tobaccos coming from the American Continent which largely supply this market, to encourage at the Exhibition to be held towards the end of March, 1908, the display of Colonial leaf tobacco.

“With this object in view, a few simple conditions have been drawn up, under which samples of Colonial tobacco weighing about 4 lbs. each will be received and properly described and shown at the Exhibition without any charge whatever to the grower. In enclosing these conditions for your perusal, the Management respectfully ask for your kind co-operation in order that the scheme may be brought to the full notice of the tobacco-growers in the Colony which you so adequately represent.

“This is absolutely the first time in which organised arrangements have been made to show in London, side by side, the tobaccos produced by our British Colonies, and it is hoped and believed it may lead to what are now comparatively unknown tobaccos finding an advantageous outlet in the London Market.

"The samples will have the great advantage of the careful examination of a Committee of Experts who are leading London tobacco leaf merchants and manufacturers competent to recognise not only the individual merit of the respective samples, but to also point out in what respect a particular sample is defective and to suggest improvements."

In the printed circular enclosed with the letter it is stated that competing samples should weigh about four pounds and should be sent, carriage paid, to reach London not later than 15th March, 1908, addressed to the Manager, Tobacco International Exhibition, 2, Monument Station Buildings, London. The Manager of the Exhibition will pay the duty, and the samples will become his property after the Exhibition unless otherwise arranged. Samples should be packed in such material as oil-skin or tinfoil, to prevent exposure to the air. Full particulars and description must accompany each sample, and extracts will be printed in the official catalogue. The importance of this is also to allow the Exhibition Authorities to properly label the samples. The labelling will be done by the Exhibition Management from the particulars supplied. The price at which the leaf is usually sold is to be stated by senders.

Colonial and Foreign Governments and merchants desiring to make a display of leaf tobacco on a larger scale than that afforded by the Open Prize Competition may take a space to exhibit, say, 100 lbs. of leaf tobacco, at a cost of £10; or a space suitable for a larger exhibit, say, 500 lbs., at a cost of £20.

The Exhibition is to be held in the Royal Horticultural Hall from the 20th to the 28th March next, inclusive. Persons desiring further information are recommended to communicate with the Manager at 2, Monument Station Buildings, London.

The *Mark Lane Express* contains a reminder that cattle cakes and other concentrated foods should not be stored in unsuitable places, otherwise they are liable to lose part of their value. The warehouse should be airy and dry. As a rule, cakes should not be stored over a stable or shed, where the warm air permeates, nor in a place where fodder is steamed. It is not an uncommon occurrence that the results obtained from the cakes are not so satisfactory as might be expected from their high quality, and the cause is due to their deterioration through bad storage. Moreover, if cake is kept in a damp place it may get mouldy and be absolutely injurious to stock.

The Land Board.

ANNUAL TOUR OF INSPECTION.

ON the 22nd October the monthly meeting of the Land Board was held. Several applicants for the small farms which have been laid off at Winkel Spruit personally supported their applications and succeeded in passing the Board. At the end of October five of the Winkel Spruit blocks remained unallotted. Two applicants were received for land in Zululand, one of whom succeeded in passing the Board. The consideration of the case of the other applicant was held over pending the receipt of certain documentary evidence which is required in connection with the application.

WINTERTON SETTLEMENT.

Leaving Maritzburg on Wednesday, 23rd October, the Board arrived at Winterton the same afternoon, and set out immediately on an inspection of the blocks lying under the small furrow. The settlers appeared to be making

SATISFACTORY PROGRESS.

A fine crop of wheat and also a young crop of tobacco were seen. Winterton tobacco, grown and cured by Mr. Joseph Pearse, is obtaining quite a reputation. In the evening a meeting of the Board was held in the dining-room of the local hotel.

The following morning at 7 o'clock the Board set out on an inspection of the lots lying under the main furrow. Each block was visited and an inspection made of the crops. The forage crops were very good and should realise remunerative prices. On Sub-division "A" of Lot 18 Mr. Anderson has planted an orchard of 3,000 trees, which should be bearing in the course of two or three years. The settlers appear to be at last making headway and are optimistic as to the future of the settlement. In the afternoon a public meeting was held, at which thirty-three blockholders and local residents were present. The most important subject discussed was the question of the conversion of the present leases into freehold, which has been provided for by Act 27, 1907, passed during the last session of Parliament. The question of laying off a number of dry farms of at least 300 acres was also brought up for consideration.

An interesting sight was to be seen at the Winterton station on Thursday, where a number of wagons laden with mealies intended for export were being off-loaded. Up to the end of October, upwards of 12,319 bags had been forwarded from the district. It is anticipated that, in view of the prices which are being realised in England, a considerably larger area will be planted during the coming season than hitherto.

VARKENSFONTEIN.

On Friday morning the Board left Winterton at 7.30 and drove through the settlement, *en route* for the farm "Varkensfontein," which is situated in the vicinity of Colenso. The Board made an inspection of the farm, which it is proposed to sub-divide and throw open for selection by persons of European descent. It is probable that "Varkensfontein" will be sub-divided into nine or ten farms. The farm, which contains good arable land, adjoins the Colenso township, and it is more than probable that the sub-divisions will be taken up within a week or two of their being thrown open for selection. On Friday night the Board interviewed an applicant for one of the sub-divisions, and also held a meeting at which were discussed certain points arising out of the public meeting held at Winterton.

WEENEN SETTLEMENT.

The following morning the Board entrained for Weenen, and arrived at the settlement in the afternoon. The same evening, a public meeting, attended by between 40 and 50 persons, was held in the Court Room, which was kindly placed at the disposal of the Board by the local Magistrate. The meeting was presided over by Mr. Acutt, the Chairman of the Board. Among those present were the Right Hon. F. R. Moor (Prime Minister), Mr. C. G. Jackson, the Magistrate of the Division, and Mr. E. R. Sawyer, the Director of Experiment Stations.

Before proceeding with the business more particularly affecting the blockholders in the Upper Settlement, Mr. Sawyer addressed the meeting on the subject of the cultivation of tobacco. Tobacco thrives particularly well at Weenen, and, with a view to encouraging the cultivation of the plant, and its proper curing, the Government has erected a curing barn, which is capable of dealing with five tons of leaf at one time. A proposal is now on foot with a view to the establishment of a Co-operative Tobacco Growing and Curing Association.

ARREAR INSTALMENTS.

The next question brought forward for consideration was one relative to the payment of the instalments of purchase price of the blocks in the Upper Settlement, which, it is regretted, have fallen into arrear. The blockholders have now proposed, with a view to bringing the arrears up to date, to arrange for the sale of their produce through an approved agent, and for the payment of a certain percentage of their receipts to the Board, in liquidation of their arrears. The further consideration of the details of the proposed scheme was entrusted to the Advisory Committee, which met the Board on Monday evening and went fully into the matter. The conclusions arrived at are now being laid before the Government. The question of the rail carriage on lucerne despatched to Maritzburg and Durban was also brought before the Board. Before the meeting was closed it was briefly addressed by the Prime Minister.

On Sunday morning the Board was conducted over the Government experimental blocks by Mr. Sawyer. The Board was much impressed with all it saw. The wheat and barley crops were particularly fine, and presented a good object lesson in what could be produced with scientific cultivation. Lot No. 34 has been laid out as an orchard and presents a very fine appearance.

After an early breakfast on Monday morning, the Board set out on an inspection of all the lots under the Upper Furrow. Each block was visited, the Board being conducted over the several blocks by the respective holders. Many of the settlers have gone in extensively for

LUCERNE CULTIVATION,

and are now beginning to derive considerable benefit from their crops. There is no doubt that Weenen is particularly adapted to the cultivation of lucerne, which is now being baled in the village and despatched to the Maritzburg and Durban markets in large quantities. Forage has also been extensively grown and realises a fair return. Tobacco is largely grown in the settlement and several acres of Lot 18 have been laid off by Mr. Slatter in vines. The Board returned from its inspection late in the afternoon much gratified with what it had seen during the day. There is no doubt that the settlement has turned the proverbial corner and is now well

ON THE WAY TO PROSPERITY.

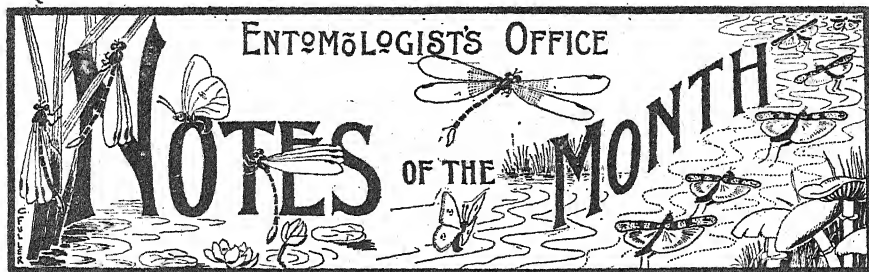
On Tuesday morning the Board entrained for Maritzburg after a very successful tour.

The Minister of Agriculture, the Hon. W. A. Deane, had intended accompanying the Board on its tour of inspection, but he was unavoidably prevented from doing so owing to an urgent call to Dundee in connection with East Coast Fever.

Persons desirous of applying for any of the farms which have been laid off at Winterton, on the Oribi Flats, in the vicinity of the Umtamvuna, and in the neighbourhood of the Umhlatazi, in Zululand, should communicate with the Secretary to the Land Board in Maritzburg.

We understand that it is also proposed to throw open the Nonoti Mission Lands, which have been sub-divided into farms of approximately 400 acres each.

Great Britain's annual import of apples is stated to be nearly 9,000,000 bushels. One-half of this amount goes there from the United States. The total from all the British possessions is under 4,000,000 bushels: Canada's share is about 3,000,000 and Australia's nearly 500,000.



Locusts in October.

THE movements of locust swarms throughout the Colony during the month of October are shown in the following table. X represents settled swarms, and O circling swarms:—

Date.	Locality.	Flight.	Date.	Locality.	Flight.
1ST WEEK.			2ND WEEK.		
1st	Eshowe (village)	N E	6th	Eshowe	S
	Ixopo, Riverside	W, O	7th	Umdlali	N
	Vryheid, Alpha	N W		Tongaat	N
	Vryheid, Leeunek	S	8th	Mapumulo	N
	Umdlali	O		Mtunzini District.	Many large
2nd	Greytown, 2 swarms	N W		swarms, laying eggs	
	Greytown	S W	8th	Eshowe Division, pairing	N
	Eshowe (village)	X, N W	9th	L. Umfolozi, Empangeni, pairing	S
3rd	Mtunzini (village)	S E		Eshowe (village), pairing	S
	Greytown	S		Avoca	N
	Tongaat	W		Mt. Edgecombe	X
4th	Eshowe (village)	S W		Isipofu	S W
5th	Weekly Police Reports—			Pinetown	S
	Nondweni and Lower Biggars-			Ottawa	S
	berg none since last season.			Murchison	E
	Ematimatole, Babanango,			Port Shepstone	S
	Nqutu, Ndumu, Verulam,			Port Shepstone, Umhlangeni	S
	Ingwavuma, Malvern, Meh-			Batstones	S
	lomnyama, and Avoca	Nil		Port Shepstone	S
				Batstones	S
				Mseleni	N E

Date.	Locality.	Flight.	Date.	Locality.	Flight.
2ND WEEK.—Continued.			3RD WEEK.—Continued.		
10th	Tonga	O	14th	Malvern	S E
	Red Hill	N E		Umhlangeni	N
	Krantzkop : Salem	O		Isipofu	S
	Eshowe, scattered all over Div.			Mtunzini	O
	Ingwavuma	N E		Eshowe, laying eggs	X
	Mseleni	N W, W		Mehlomnyama	X
11th	Mt. Edgecombe	Eggs		Lower Umfolozi, eggs	X
	Darnall	Eggs		Stanger, Doesburg	X
	Riet Valley	X		New Guelderland, eggs	X
	Umvoti R., Glendale	X		Stanger, about to lay	X
	Umzumbi	N E		Westville, pairing	S
	Hillarys	S	15th	Groutville	S E
12th	Pinetown	N W		Malvern	S
	Verulam	W		Darnall, still laying	X
	Stanger	W-N, E		Inanda	W
	Northdene	O		Mt. Edgecombe, still laying	X
	Malvern	S		Mehlomnyama	O
	Avoca	X	16th	Bowkers	S E
	Eshowe	N E		Sydenham	S E
	Mehlomyama	S W, O		Richmond	W
	Isipingo	S		Hillarys	S
	Pinetown	S E		Camperdown	N E
	Eshowe, laying all over district	S		Mapumulo, laying	X
	Mt. Edgecombe, eggs laid	X		Verulam, pairing	X
	Vryheid, Reitfontein, eggs laid	X		Table Mountain, pairing	X
	Nongoma, about to lay	S		Ingwavuma	X
	Amatikulu, laying heavily	X	17th	Krantzkop, eggs	X
	Empangeni, laying heavily	X		Avoca, laying	X
	Mseleni	N W		Camperdown	X
	Mseleni	S S W		Inchanga	N E
	Weekly Police Reports—			Stirk's Spruit	X
	Babanango, Hill Crest, Emati-			Harding (lot R)	S
	matolo, Umvoti Poort	Nil	18th	L. Umkomaas, Ellingham,	
3RD WEEK.				laying	X
13th	Verulam	S E		Glendale	X
	Malvern	S E		L. Umkomaas, Amahlongwa	X
	Pinetown	E		Dumisa, pairing	O
	Umdlali	S		Ubombo, Tegana, eggs	X
	Eshowe	E		Paulpietersburg	S E
	Umhlangeni	N	19th	Tonga	X
	Isipofu	S		Umbogontwini, Isipingo, pair-	
	Westville	S		ing	X
				Mapumulo, Isitonde, eggs	X
14th	Verulam	N E		Ubombo	E
	Mt. Edgecombe	E		Weekly Police Reports—	
				Ndumu, Nqutu, Ematimatolo	Nil

Date.	Locality.	Flight.	Date.	Locality.	Flight.
4TH WEEK.			4TH WEEK.—Continued.		
20th	Avoca	X	23rd	Babanango	Nil
	Mt. Edgecombe, laying	X		Vryheid, White Umfolozi, eggs	
	Illovo River	S		South Coast Junction	N
	Mehlomnyama	X		Vryheid, Waterfall	X, S E
	Krantzkop, Speckfontein	X		Krantzkop	S
	Westville	S		Bellair	N
21st	Verulam, eggs	X		Westville	S
	Tongaat, eggs	X	24th	Isipofu	S
	Sydenham, locusts flying S E			Pinetown Bridge	N E
	all the week			Nduma, Hill Top, eg ₂ s, starting to move	S
	Lower Illovo, eggs	X		Ingwavuma, pairing	N E
	Vryheid, Black Umfolozi, laying	X	25th	Richmond, eggs	S E
	Umzinto	S W		Tongaat	X
	Winkel Spruit	S		Glendale Valley, several swarms	X
	Umzinto	S	26th	Avoca, laying	X
	Murchison Flats, expected to lay	X		Lower Umkomaas, laying	X
	Sea View	W		P.P.Burg, Nooitgedacht	E
	Mapumulo	S		Boshoff Drift, Alfred,	N E
	Pinetown	E		Nqutu	Nil
	Westville	S		5TH WEEK.	
22nd	Equefa	S W	27th	Hillcrest	X
	Umlhali	S		Umzumbi Rail	S
	Winkel Spruit, continuous stream	S		Esperanza, Beneva, eggs	X
	Scottburg, Umlazi M.R.	N		Ifafa M.R., eggs	X
	Bowkers	O		Pinetown, eggs	X
	Verulam	N	28th	Umzumbi Valley, pairing	X
	Umzinto	S		Richmond, pairing	S
	Vryheid, Nhlozatshe, laying	X		Leeunek, Ntabankulu	N E
	Pinetown, pairing	X		Mehlomnyama	Nil
	Sea View	E	29th	Richmond, Waterfall, eggs	
	Beaumont	E		Umlazi Location, W. Boundary, eggs	
	Umtwalumi (2 swarms)	S W		Intambo's Location, eggs	
	Richmond	W, O		Tim Ogles Location, eggs	
	Clairmont	N E		Junction of Illovo and Umquahlumbi, eggs	
	Isipingo	O		Ifumu, Isipingo	
	Westville	S		Leeunek	N E
	Noodsberg	S E		Babanango	Nil
	Adam's Mission Station	N	30th	Krantzkop, Siblobo's Location, eggs	
	Louwsberg	S E	31st	Alexandra Locations, Nos. 4 and 6, eggs	
23rd	Umzinto	S W	November.		
	Sea View	W	1st	Umtwalumi, laying	O
	South Coast Junction	W		Noodsberg	E
	Lower Umkomaas	N			
	Bowkers	S E			
	Pinetown	W			
	Umzinto	N			
	Isipofu	X			

LOCUST EXTERMINATION.

In view of the extensive deposits of locust eggs in Zululand and parts of the Colony, and the presence of many swarms of locusts which have not yet laid eggs, it has been thought expedient to outline the policy of the Department of Agriculture in connection with the general administration of the Locust Extermination Act, and with the destruction of locusts appearing upon Crown lands, native reserves, and locations. It has been found impracticable to appoint locust officers to supervise the work of locust destruction in settled areas upon lands owned by or occupied by Europeans, Indians, and Natives. Consequently, all farmers and other occupiers of land are relied upon to report either to the nearest Police Station, Magistracy, or to the Chief Locust Officer, any case of negligence coming under their notice in settled areas. Local farmers and agricultural associations are relied upon to encourage an active campaign against hoppers in their spheres of influence.

In order that the law may be enforced as thoroughly as possible, the Government will place the prosecution of defaulters in the hands of the Natal Police, the members of which force are to be appointed *ex officio* officers under the Locust Act. Instructions are being issued for the prosecution of all offenders.

Arrangements are now well forward for the destruction of locusts in the following Divisions and Locations, so far as departmental work is concerned:—In Zululand: Ndwandwe, Hlabisa, Emtongweni, Lower Umfolosi, Eshowe, and Mtunzini. In the Northern Territories: Ngotshe and Vryheid. In Natal: Tugela, Mapumulo, and Umlazi Locations; also the Locations of Alexandra and Lower Umzimkulu Divisions. In all 20,000 lb. of poison, 30,000 lb. of sugar, and 720 gallons of treacle, together with a fresh supply of spray pumps, have been railed forward to centres in the threatened areas, and further supplies are in readiness for districts in which egg-laying is expected in the course of the next few weeks. Data regarding the movements of locusts and the depositing of eggs are being satisfactorily collected by means of the free locust postcards. Since August, 524 of these reports have been received and tabulated by the Entomologist. Farmers and others who are willing to help the Department in the collection of this important information, and who are not in possession of postcards, are requested to apply to the Government Entomologist for a supply of the same.

As far as is expedient, and consistent with economy, the Department will place on sale at various centres a supply of arsenite of soda. Farmers are expected, however, to make early application to the Government Entomologist for their requirements, as it is impossible to distribute supplies at many centres. Pumps will not be supplied by the Government. Poison may be obtained, rail free, from the head office stores at 25s. per 50 lb.

drum, or at 4s. per tin of about 7 lb., but no application for an issue of over 500 lb. will be entertained, nor will any poison be issued except upon prepayment.



LOCUST FUNGUS.

SOUTH AFRICAN SUCCESS.

Mr. H. D. Hawkesworth, Esperanza, writes:—

“You may be interested to know how the fungus is working among the locusts down here.

“I have been applying the fungus to the swarms for many years now, and the result is always good. I collect the dead locusts, dry them in the shade, and put them in tins for future use when required. When the locusts come to lay I choose a cold or wet day and rub up a lot in warm water and sugar (locusts like sweet things), put in an open tin; then catch the couples, dip them well, and let them go. About the fourth day the locusts begin to die. Then I collect these and do a lot more, and they die in quantities. Fresh swarms come in and get the disease, and then carry it all over the country. This month I noticed lots of dead locusts six miles from where I started the fungus. It weakens a swarm at once; and I notice that some of the females are too weak to lay their eggs. The fungus will break out in the hoppers later on and destroy them completely. It works best in damp weather, but dry, hot weather does not kill it.

“Locusts laid great quantities of eggs on my farm the end of October; but to the best of my belief all the eggs have been destroyed by the fly. Every lot I dig up is a mass of maggots.

“I send you some dead locusts. Damp them well and put them in a dark place: the fungus will soon appear.”

[The fungus had already appeared when the locusts arrived.—C. F.]

RECENT TRIALS IN INDIA.

Several trials have been made in India, in the past, of the South African locust fungus for the destruction of locusts. Tubes of the fungus were obtained from this country in 1899, and the supply was propagated at the Mukhtesar Bacteriological Laboratory for distribution to officers for testing its effect on the occurrence of locust plagues. The results of these trials were, however, negative; and in 1902 the Indian Government decided to discontinue the issue of the fungus tubes, pending

the result of further investigation and experiments. Early in 1906 six tubes containing pure cultures of "locust fungus" (*Mucor exitiosus* Massee) were obtained through Mr. Claude Fuller, Natal Government Entomologist. Experiments with this fungus were conducted on the Bombay Locust (*Acridium succinctum* Linn.) and the Black Spotted Grass hopper (*A. aeruginosum* Burm.) during the end of April and first part of May, 1906, and upon the North-West Migratory Locust (*A. peregrinum* Oliv.) and the Rice Grasshopper (*Hieroglyphus furcifer* Serv.) in July; and a report has lately been issued by Dr. E. J. Butler, Imperial Mycologist, and Mr. H. M. Lefroy, Imperial Entomologist, who conducted the experiments at the Pusa Research Institute.

The conclusions arrived at are that, judging from the results of the experiments, the fungus does not appear capable of making a good growth, even when inoculated into wounds, on *A. aeruginosum* or *A. succinctum*, but that it does grow on the North-West Migratory Locust to some extent; that the spores may be eaten with impunity by all the species tested; and that locusts, living in a moist atmosphere charged with spores, flourish even when sprayed with the spores. The only indication of success in any of these experiments, the writers remark, is the death of the three North-West Migratory Locusts (*A. peregrinum*). As against these deaths being due to the fungus, are the facts that in one of the experiments the dead locusts were proved incapable of transmitting infection, and that no trace of the fungus could be discovered on the dead bodies, which were incubated, except on that used in the experiment referred to. "The method is too uncertain," the writers conclude, "to be of any assistance in the field, where nothing but the most virulent infective power is likely to be of value. The conditions in nature are much more in favour of the insect, and against the fungus, than those under which the experiments were made, and if we can only anticipate a small percentage of infections the method will certainly fail. Against the Bombay Locust, the Black Spotted Grasshopper, and the Rice Grasshopper, it is entirely useless."

[Investigations recently conducted in the Transvaal by Mr. S. Pole-Evans, the Government Mycologist, have conclusively shown that the locust fungus propagated artificially in tubes and known as *Mucor exitiosus* is a true saprophyte which only grows upon the bodies of dead locusts and cannot be induced to grow upon live locusts. Further, the fungus which destroys the locust (*Empusa grylli*) is a parasite which grows only upon live locusts and cannot be propagated in artificial media. This fact helps to explain the general want of success in the trials of what is called South African locust fungus by investigators not only in India but also in Australia and North and South America, and the success which a number of local people have met with (as in the case of Mr. Hawksworth, whose letter appears above), by the use of locusts which have died of the true fungus.—C. F.]

THE KEEVER BEETLE.

The following letters on the subject of the Keever beetle (*Heteronychus arator*, Fron.) have been received from Mr. J. H. Lilienthal, of Dronk Vlei, who has before drawn the attention of this office to the insect. Though the pest seems quite uncommon in Natal, it is a well-known pest in the eastern parts of Cape Colony, where it goes by the popular name of the "Keever Beetle." It is said to be very widespread, and generally injurious, especially to wheat. As in the case of the mealies, it destroys wheat by eating away the roots beneath the soil. According to Miss Ormerod, the Keever beetle deposits its eggs in the soil, and the grubs are equally as destructive as the adults. It is said that "the insects never attack grain sown in ground that is newly broken up, even though it be within a yard of their old scene of operations. The ground must have been cultivated two or three years before they attack the crops on it."

The Keever beetle is about three-fifths of an inch in length. It is quite black, oval in outline, and very convex. It belongs to the family *Dynastidae* and has a very general resemblance to a number of small dung beetles.

Writing under date 1st November, Mr. Lilienthal says:—

"Enclosed I send a phial containing grub of *Heteronychus arator*, for which you asked some considerable time ago. The grubs were turned up from a depth of about two inches from grey soil; two beetles were also observed. The reason that I never came across the grub before this is that my present cultivations of more than 200 acres consist chiefly of rich river soil (bottom lands), in which the beetle has never been observed. Only about 10 acres are grey soil; and from what I saw to-day I do not think it possible that a crop will be gathered. However, I shall simply throw these few acres out of cultivation once more; and, having more bottom lands at my disposal, it is easily understood that personally I shall be little concerned about this pest. But as in this locality, perhaps elsewhere in the Colony, many grey soils are cultivated, it can do no harm if I state my opinion on the most practical way to exterminate the beetle.

"From what I can gather, all grey soils here are infested with beetle; I have heard of no river soil. This may appear strange to you, but should you come to Dronk Vlei, my homestead is alongside Inconza, Natal-Cape line, and within easy reach of my cultivations, so that it will be no trouble to investigate.

"The beetle having become so numerous now, and taking into consideration its habits, which I have previously described, it is impossible to take action against the adult. The only feasible way seems to me to apply winter-cultivation, and through continual stirring of the soil destroy grub and pupa. Almost all tillage implements—plough, float, drag and disc harrow—will do good service in this direction. Perhaps the frost in this country is too light, and that exposure to same will assist much

in the destruction. You will observe that almost the slightest touch will rip open the grub. In my case of cultivation this day, the land was double disked and about 50 per cent. of the grub were injured. The pest looks to me as serious to mealie cultivation as cut-worm and stalk-worm combined."

In another letter, dated the 8th November, Mr. Lilienthal wrote:—

"On the 2nd inst. I sent you some grub of *Heteronychus arator* from a field where the beetle made its first appearance; which field was not cropped last season.

"This day I had some land ploughed, in which the mealies were partly destroyed by the beetle last year, divided from above field by a 20 feet road only. Naturally I was surprised to see neither beetle nor pupa; but on closer observation I discovered the cockchafer grub enclosed. Judging from its size and the locality from which it was taken, I believe it is the very thing you want. Further, I have found only one grub of this shape and larger, mostly prevalent in old manure kraals, but this grub was here before the advent of above beetles. I had a quantity of grub, but they had mashed one another, so I deem it safe to send one only.

"Having passed my opinion on the possible eradication, I stated winter-ploughing, but having written rather in a hurry, I omitted to state that apart from killing the beetle in its different stages of development in stirring the soil, the principal effect would be starving the insect through keeping down all vegetation till planting time. However, if any pasture should be adjoining, without doubt some beetles will always enter the cultivated area."

One of the buoyant factors in the cattle market, says the *Rural Californian* (Los Angeles), is the high price of hides. The demand for leather is so strong that the slaughter of cattle is not sufficient to keep up with it.

The value of ploughing matches is evident, says the *Agricultural Gazette* (London). They bring farmers and their men closer together in friendly rivalry in a contest where each is striving to outdo his neighbour in one of his most important farming operations. They discuss the merits of good ploughing and compare the good work with the poor. It is safe to say that the man who takes part in a ploughing match will be a better farmer thereafter, and will take more interest in his work, even if he does not win a prize.

Landbouw Wetten—Zitting, 1907.

ONDERSTAANDE zijn de voornaamste voorzieningen van de Wetten betrekkelijk landbouw door het Parlement aangenomen gedurende de pas geëindigde Sessie:—

AKTE No. 6, 1907.

“Om voorziening te maken voor de verplichtende omheining van gronden binnen de Kolonie Natal.”

2. (a) Met het doel om de verspreiding van de veeziekte bekend als de Oost Kust Koorts te voorkomen, en niettegenstaande eenig iets vervat in de Omheinings Wet, 1887, of de Wetten en Akten dezelve amendeerende, kan de Minister van Landbouw, met de goedkeuring van den Gouverneur in Rade heiningen laten oprichten langs de lijnen van eenige plaatsen binnen een besmet of verdacht area of van eenige inboorlingen locatie of van eenige dorpsgronden binnen zoodanig terrein. (b) Het woord “omheining” in deze Akte zal beteekenen eene heining goedgekeurd door den Minister van Landbouw.

3. (1) De kosten van de oprichting van eenige heining langs de grenslijnen van eenige plaats zullen in de eerste instantie betaald worden uit gelden door Parlement gestemd. Zoodanige kosten zullen terugbetaald worden, tezamen met de interessen daarop tegen de koers van vijf per centum per jaar, door dertien jaarlijksche paaiementen, het eerste betaalbaar twee jaren na de omheining voltooid is. Zoodanige paaiementen zullen berekend en vastgesteld worden zoo dat de gezegde kosten met interessen daarop ten volle terugbetaald zullen zijn binnen een tijdperk van dertien jaren van af den datum waarop het eerste paaiement schuldig wordt. (2) Zoodanige terugbetalingen van de kosten en interessen zullen gemaakt worden door den eigenaar van eenige plaats omheind onder de laatst voorafgaande sectie of als de heining de plaatsen van aanliggende eigenaars scheidt dan zal elk zoodanig eigenaar een helft belaten van de kosten van het gedeelte der heining zoodanige plaatsen scheidende tezamen met de interessen voormeld. (3) Het woord “eigenaar” in deze en de volgende secties zal beteekenen den persoon geregistreerd als de eigenaar op het kantoor van den Registrateur van Akten en het woord “plaats” zal eenig gedeelte van eene plaats inbegrijpen. (4) Als eenige plaats of area begrensd is door eenigen rivier-oever, donga of spruit, zal de Minister van Landbouw de macht hebben de heining op te richten langs een of ander meer gelegen lijn. In zoodanig geval zullen de kosten van de heining uitsluitelijk door het Gouvernement gedragen worden dat het recht zal hebben dezelve van de hand te zetten of te verwijderen wanneer wenschelijk. (5) Waar het aangrenzende land Kroon grond is of ge-

houden wordt door de Natal Native Trust zal het Gouvernement of de Natal Native Trust, zoo het geval eischt, eene helft van de kosten der heining dragen.

4. De Minister van Landbouw zal den Registrateur van Akten in geschrifte bekend maken met het bedrag verschuldigd door eenigen eigenaar onder deze Akte, en de Registrateur van Akten zal op ontvangst van zoodanige bekendmaking het gezegde bedrag aanteekenen in het Land Register en zal aan den Minister van Landbouw een certificaat leveren uiteenzettende zoodanig bedrag en den datum der aanteekening. De kosten van zoodanige heining zullen een eerste vordering en verband ten gunste van het Gouvernement op het land alzo omheind zijn, en zoodanig verband zal voorkeur hebben over eenig bestaand verband daarop. Een aanteekening zal door den Registrateur van Akten gemaakt worden in het Publieke Schuld Register van de bijzonderheden van zoodanige schuld verschuldigd aan het Gouvernement, en van het verband op den grond.

5. Wanneer eenige zoodanige plaats voormeld gehouden onder huurcontract omheind is door eene heining opgericht onder deze Akte gedurende den loop van de huur, zullen de verhuurders gerechtigd zijn te ontvangen van den huurder van af den datum wanneer zoodanige plaats alzo omsloten werd eene betaling van vijf per centum per jaar op enige som die hij aan den Minister van Landbouw betaald mag hebben onder Sectie 3, en zoodanige betaling zal geschieden tezamen met de huurgelden der plaats en zal beschouwd worden naar rechten deel te zijn van zoodanige huur.

6. Wanneer de Minister van Landbouw ook eenige kosten gemaakt zal hebben ten opzichte van de omheining onder deze Akte ten opzichte van enige dorpsgronden die het eigendom geworden zijn van de Corporatie van eenige Municipaliteit of het Plaatselijk Bestuur van eenig Dorpgebied, zullen de kosten terugbetaalbaar zijn door zoodanige Corporatie of Plaatselijk Bestuur op wijze voorschreven door subsectie 1 van Sectie 3 van deze Akte.

7. Niets in de voorgaande secties zal beschouwd worden eenigen persoon verantwoordelijk voor de kosten van de oprichting eener heining onder deze Akte te beletten gekeurde materialen of dienst of transport bij te dragen tot de kosten van zoodanige heining en eenige zoodanige bijdrage zal afgetrokken worden van de bedragen vermeld in de gezegde secties respectievelijk volgens eene waarde te worden bepaald bij gebrek van een overeenkomst door den Magistraat van het District.

8. De Minister van Landbouw kan laten omheinen:—(1) Eenige paden hetzij publiek of privaat eenig deel der Kolonie doorlopende; (2) Eenige grenzen der Kolonie of uitspanplek in de Kolonie; en de kosten van eenige omheining opgericht onder de machten dezer sectie kunnen geheel bestreden worden uit de gelden gestemd door Parlement voor de doeleinden van deze Akte.

9. Deze Akte zal gelezen en uitgelegd worden in verband met de voorzieningen der Omheining's Wet van 1887 en de amendeerende Akten voor zoo ver dezelve toepasselijk daarop zijn; en de Minister van Landbouw zal de macht hebben eigenaars te gelasten eenige heiningen behoorlijk te onderhouden en in goede reparatie te houden; en, wanneer zij in gebreke blijven, kan hij zoodanige reparatie ten uitvoer brengen op kosten van den eigenaar, onderworpen aan de voorzieningen van sectie 3 van deze Akte. Geen persoon zal verwijderen of op eenige wijze zich bemoeien met eenige heining opgericht of onderhouden onder autoriteit van deze Akte.

10. De Gouverneur in Rade kan van tijd tot tijd regulaties maken, en eenig persoon overtredende zoodanige regulaties zal, bij overtuiging in het Hof van een Magistraat, onderhevig zijn aan eene boete niet te boven gaande Tien Pond (£10) of bij wanbetaling tot gevangenisstraf met of zonder harde arbeid voor een tijdruimte niet te boven gaande eene maand.

11. Eenig persoon die Sectie 9 van deze Akte overtreedt zal, bij overtuiging in het Hof van een Magistraat, onderhevig zijn aan eene boete niet te boven gaande Vijf en Twintig Pond (£25), of tot gevangenis met of zonder harde arbeid voor eenige tijdruimte niet te bovengaannde zes maanden.

AKTE No. 7, 1907.

"Om te amendeeren Akte No. 53, 1906, getiteld 'om den Gouverneur te machtigen de somma van £100,000 van de Geconsolideerde Leenings Fondsen te leenen te worden aangewend tot het voorkomen of onderdrukken van de ziekte bekend als Oost Kust Koorts.'"

1. Sectie 3 van Akte No. 53, 1906, wordt hiermede herroepen en de volgende daar in de plaats voor gesteld:—

De doelenden waarop deze Akte toepasselijk is zijn als volgt:

- (1) Leeningen aan vee eigenaars of anderen die zoodanige hulp behoeven om hunne gronden te omheinen, om transport dieren aan te koopen of anderszins tot het voorkomen of de onderdrukking der ziekte bekend als Oost Kust Koorts;
- (2) De aankoop door het Gouvernement van zoodanige ezels, muilen, paarden, wagens of trekgoed als noodig mogen zijn tot het daarstellen van een transport dienst in eenig district waarin de beweging van ossen belet moge worden onder de voorzieningen van de Oost Kust Koorts Akte No. 32, 1903, en alle amendeerende Akten thans van kracht en eenige regulaties daaronder gemaakt,

AKTE No. 8, 1907.

“Om te amendeeren Akte No. 32, 1903, getiteld Akte ‘Om de verspreiding van de Ziekte bekend als Rhodesische Rooiwater te verhinderen.’”

1. De volgende clause zal toegevoegd worden tot Akte No. 32, 1903:

De Minister kan ten eenigen tijd wanneer hij het noodig beschouwt zulks te doen ten einde de verspreiding der ziekte te voorkomen, gelasten de verwijdering van vee van een besmet terrein of van eenige plek aan een besmet terrein liggende, en ze van de hand zetten voor onmiddellijke slachting: Mits, echter, dat de eigenaar van eenig zoodanig vee de keus zal hebben om alle dezelve door private overeenkomst, voor slachten, van de hand te zetten binnen eene week na hem schriftelijke kennis is gegeven. Als de eigenaar zoodanig vee alzoo van de hand zet moet hij voldoen aan al de Gouvernements vereischten, en aan alle regels en regulaties welke van kracht mogen zijn betrekkelijk de verwijdering van vee. Voor vee alzoo genomen zal betaald worden tegen de prijzen uiteengezet in de Schedule tot deze Akte.

2. De Schedule tot Akte No. 54 van 1906 wordt hiermede herroepen, en de volgende Schedule vastgesteld in plaats daarvan, namelijk:—

SCHEDULE.	£	s.	d.
Jaar oud ossen of bullen, tot	2	0	0
Jaar oud vaarzen, tot	3	0	0
2 jaar oud ossen of bullen, tot	3	0	0
2 jaar oud vaarzen, tot	4	0	0
3 jaar oud ossen of bullen, tot	4	0	0
3 jaar oud vaarzen, tot	5	0	0
Koeien, 4-8 jaren, met kalvers, tot	7	10	0
Koeien, 4-8 jaren, zonder kalvers, tot	6	10	0
Ossen, over 4 jaren, tot	7	0	0
Koeien, 8-12 jaren, met kalvers, tot	6	0	0
Koeien, 8-12 jaren, zonder kalvers, tot	5	0	0
Oude koeien, met kalvers, tot	4	0	0
Oude koeien, zonder kalvers, tot	3	0	0
Bullen, 4 jaren en ouder, tot	4	0	0

AKTE No. 14, 1907.

“Om te amendeeren Akte No. 27, 1899, getiteld ‘Akte om voorziening te maken voor de inspectie en het onderzoeken van vee in deze Kolonie aankomende over zee, en om den invoer der ziekte tuberculose te voorkomen.’”

1. Deze Akte zal gelezen en uitgelegd worden samen met Akte No. 27, 1899, hierinna genoemd de principale Akte.

2. De woorden "of land" zullen ingelascht worden na de woorden "over zee" in de tweede sectie der principale Akte.

3. Secties 4, 5, en 6 van de principale Akte worden hiermede herroepen, en de volgende daarvoor in de plaats gesteld:—

Alle vee Natal binnen gebracht over zee uitgenomen die vergezeld van certificaten gegeven door bevoegde Veeartsenijkundige Ambtenaren door den Minister van Landbouw goedgekeurd, zal op aankomst in kwarantaine gesteld worden tot zij getoetst zijn door den Onderzoeker met tuberculin, en zullen niet ontslagen worden uit zoodanige kwarantaine voor dat de Onderzoeker ze certificeert vrij te zijn van eenige reactie die aantoonst dat zij besmet zijn met tuberculose in den vorm van de Schedule tot deze Akte.

Vee Natal binnen gebracht over eenig binnenlandsch grens, kan, naar discretie van den Minister van Landbouw, vereischt worden in kwarantaine geplaatst te worden bij de ingangsplek, of op aankomst ter hunner bestemde plaats, en aldaar te worden getoetst met tuberculin door een ambtenaar van het Veearts Departement, en het vee zal niet uit zoodanige kwarantaine ontslagen worden voor dat zij gecertificeerd worden door zoodanigen ambtenaar vrij te zijn van eenige reactie die aantoonst dat zij besmet zijn met tuberculose in den vorm van de schedule tot deze Akte.

4. Sectie 7 van de principale Akte wordt hiermede herroepen, en de volgende daarvoor in de plaats gesteld:—

In geval eenig zoodanig dier blijkt besmet te zijn met de ziekte tuberculose zal het niet levend verwijderd worden van het kwarantaine station maar zal aldaar afgemaakt worden: Mits dat de eigenaar in gevallen van dieren ingevoerd over zee de keuze mag hebben het dier terug te zenden of wederom ter schep te brengen, in welk geval het direct van het kwarantaine station naar het vaartuig genomen zal worden.

5. De woorden "of land" zullen ingelascht worden na de woorden "over zee" in Sectie 12 van de principale Akte.

6. Eenig vee dat toegelaten werd te landen onder de 13de Sectie der principale Akte zal geinspecteerd en gebrandmerkt worden met een geschikt brandmerk voorgeschreven door den Principalen Veearts, en zij zullen geslacht worden binnen een tijdruimte van een kalender maand van af den datum der landing in de Kolonie.

In geval van vee alzoo ingevoerd komende uit Landen waar tuberculose bekend is te bestaan zal zoodanig vee gekwarantaind worden tot zij geslacht worden en hunne karkassen of eenig gedeelte daarvan zullen niet verwijderd worden totdat zij gekeurd zijn, als geschikt voor menschelijk voedsel, door een Gouvernements Veearts,

Indien eenig zoodanig vee niet geslacht wordt binnen eene maand, of binnen zoodanig langer tijdperk als toegestaan moge worden door den Principalen Veearts, zal de eigenaar onderhevig zijn ten opzichte van elk dier aan eene straf als voorgeschreven in Sectie 12 van de principale Akte.

AKTE No. 15, 1907.

“Om de Akte op het voorkomen van Longziekte, 1897, te amendeeren.”

1. Het woord “eigenaar” als gebruikt in de Longziekte Voorkomings Wet van 1897 (hierina genoemd de principale Akte) zal insluiten een vennootschap, maatschappij of Corporatie.

2. Het woord “longziekte” zal beteekenen de ziekte bekend als besmettelijke *pleuro-pneumonia* in dieren van de os soort.

Sectie 3 van de principale Akte wordt dienovereenkomstig geamendeerd.

3. De benoeming van vee inspecteurs zal door den Minister van Landbouw gemaakt worden en niet door den Gouverneur in Rade of door den Gouverneur, als voorzien onder secties 5 en 6 van de principale Akte.

4. Sectie 8 van de principale Akte wordt hiermede herroepen, en de volgende wordt in de plaats daarvan vastgesteld:

In geval eenige troep verklaard wordt door een Gouvernements Veearts of zoodanigen Inspecteur besmet te zijn met de ziekte van longziekte, zal den eigenaar van zoodanige troep eene licentie vergund worden, overeenstemmende zoo na mogelijk met den vorm der licentie voorgeschreven in Schedule B, om zoodanig vee voor een tijdperk van drie manden te houden ten einde de troep te zuchten of in te enten en met eens af te maken eenig dier dat een Gouvernements Veearts of Inspecteur verklaart de kenteekenen van longziekte te toonen. Elk zoodanige licentie zal eene conditie bevatten dat het vee daarmede gelicentieerd zal, naar keuze van den eigenaar, meteen gezucht of ingeent worden tot voldoening van den Inspecteur, en dat alle dieren toonende teekenen der ziekte dadelijk afgemaakt zullen worden. Wanneer zoodanige licentie verlopen is zal de Gouvernements Veearts of Inspecteur zoodanige troep weer inspecteeren en, mocht er een geval van longziekte in zoodanige troep geweest zijn binnen het tijdperk der licentie, zal de licentie hernieuwd worden voor een verder tijdperk van drie maanden van af den datum van het laatste voorval, en zoodanige inspectie zal hernieuwd worden elk drie maanden totdat zoodanige troep vrij van de ziekte gevonden wordt. Geen vee zal toegelaten worden verwijderd te worden van het land waarop zij gelicentieerd zijn totdat de Gouvernements Veearts of Inspecteur de troep schoon zal verklaren, onder straffe

van hoogstens Vijf-en-twintig Ponden sterling, of bij wanbetaling daarvan, aan gevangenisstraf van hoogstens drie maanden.

5. De kennis vereischt te worden gegeven door den eigenaar onder Sectie 9 van de principale Akte zal aan den Districts Veearts of den Inspecteur zijn, en niet aan den Magistraat als voorzien onder de gezegde sectie.

6. In geval een dier afgemaakt wordt op order van een Gouvernements Veearts of Inspecteur onder de voorzieningen van Sectie 4 dezer Akte, zal compensatie aan den eigenaar van zoodanig dier betaald worden tegen de prijzen uiteen gezet in de Schedule A van deze Akte; Mits dat in het geval dat de eigenaar schuldig is aan eenige nalatigheid door in gebreke te blijven om te rapporteeren of door eenig onbehoorlijk verzuim in het rapporteeren van eene uitbreking, dan zal geen zoodanige compensatie betaalbaar zijn.

7. Sectie 10 van de principale Akte wordt hiermede herroepen, en de volgende wordt in de plaats daarvan vastgesteld:—

Alle vee alzoo gelicentieerd zullen afgezonderd worden door ze op te passen, of anderszins, op eene distantie van niet minder dan tien yards van de lijn van het eigendom waarop zij gelicentieerd zijn, en van eenig publiek pad.

Voor elke overtreding van deze voorziening zal de eigenaar onderhevig zijn, bij overtuiging in het hof van een Magistraat, tot eene boete van hoogstens Dertig Ponden Sterling of, in gebreke van betaling, tot gevangenisstraf met of zonder harde arbeid voor eenig tijdperk niet te bovengaande zes maanden:

Mits dat als het bewezen wordt tot voldoening van den Gouvernements Veearts of Inspecteur, in het geval waar een plaats doorsneden wordt van een publiek pad of paden, dat het absoluut noodig is voor gelicentieerde vee om over of langs zoodanig pad of paden te gaan of te worden gedreven de Inspecteur gemachtigd is zoodanige verwijdering toe te laten onder de beperkingen vervat in Sectie 13 van de principale Akte.

8. Schedule B van de principale Akte wordt hiermede herroepen en de volgende wordt in de plaats daarvan vastgesteld:—

SCHEDULE B.

Ik certificeer dat een troep van (noem aantal).....stuks vee behorende aan.....op de plaats.....in Wijk.....County van.....besmet is met longziekte, en ik verleen hiermede aan de gezegde.....licentie dezelve voor drie maanden van af datum te houden met het doel om te voldoen aan de condities van Secties 8, 9 en 10 van Akte No. 30, 1897, als geamendeerd door Akte No. 15, 1907, als hierop geendosseerd.

Gedateerd te.....dezen.....dag van.....19....

.....

SCHEDULE A.		£	s.	d.
Jaar oud ossen, tot		2	0	0
Jaar oud vaarzen, tot		3	0	0
2 jaar oud ossen, tot		3	0	0
2 jaar oud vaarzen, tot		4	0	0
3 jaar oud ossen, tot		4	0	0
3 jaar oud vaarzen, tot		5	0	0
Koeien, 4-8 jaren, met kalveren, tot		7	10	0
Koeien, 4-8 jaren, zonder kalveren, tot		6	10	0
Ossen over 4 jaren oud, tot		7	0	0
Koeien, 8-12 jaren oud, met kalveren, tot		6	0	0
Oude Koeien, met kalveren, tot		5	0	0
Oude Koeien, zonder kalveren, tot		4	0	0
Bullen, onder 4 jaren, tot		3	0	0
Bullen, over 4 jaren, tot		1	0	0

AKTE No. 28, 1907.

“Om te amendeeren Akte No. 44, 1904, betiteld Akte, om de landbouw ontginning van Natal te ondersteunen en bevorderen.”

1. Sectie 12 van de Landbouw Ontginnings Akte No. 44, 1904, hierinna genoemd de principale Akte, wordt hiermede herroepen.

2. De volgende clause zal bij Sectie 34 van de principale Akte gevoegd worden:—

Een “allottee” zal gerechtigd zijn, wanneer hij de Commissie voldoende toont dat hij het perceel in zijn bezit voordeelig geoccupeerd heeft voor een tijdperk van vijftien aaneenvolgende jaren, tot een vergunning als vrij eigendom van het perceel alzoo geoccupeerd, op zoodanige voorwaarden omtrent de betaling van de koopsom als de Gouverneur in Rade toe mag besluiten op advies van de Land Commissie.

3. De volgende clause zal bij Sectie 36 van de principale Akte gevoegd worden:—

De “allottee” zal gerechtigd zijn, wanneer hij de Commissie voldoende toont dat hij het perceel in zijn bezit voordeelig geoccupeerd heeft voor een tijdperk van vijftien aaneenvolgende jaren, tot een vergunning als vrij eigendom van het perceel alzoo geoccupeerd, op zoodanige voorwaarden omtrent de betaling als de Gouverneur in Rade toe mag besluiten op advies van de Land Commissie.

AKTE No. 29, 1907.

“Om den uitvoer van Struisvogels en Struisvogel eiers te verbieden.”

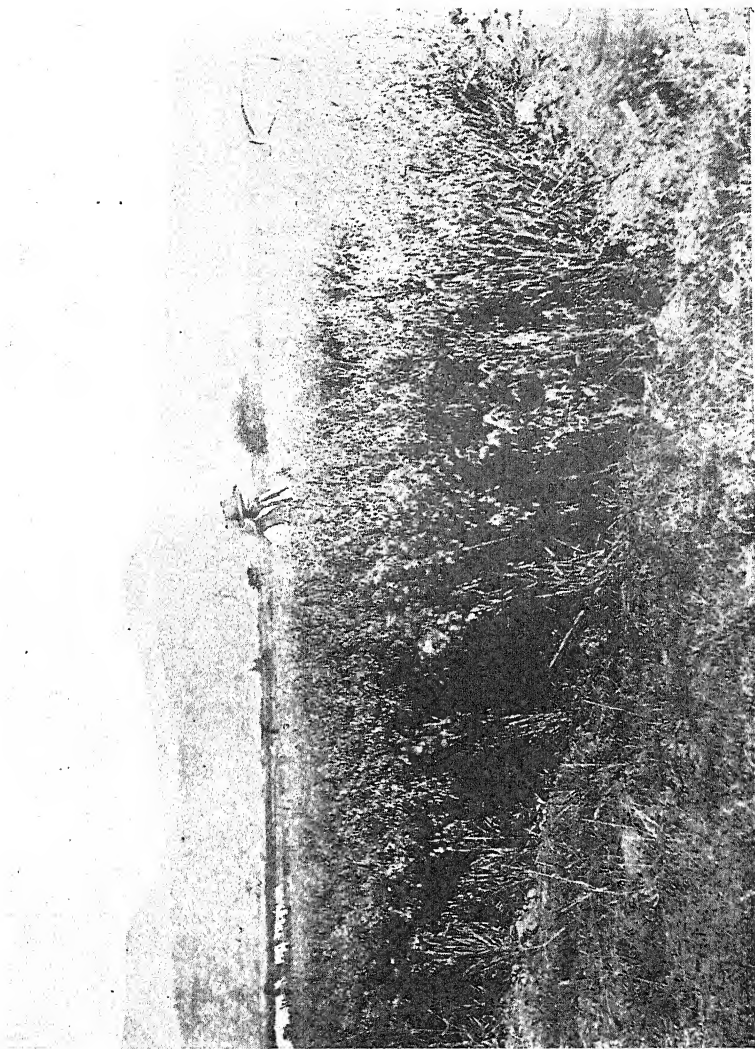
2. Het zal niet wettig zijn eenigen Struisvogel of eenig Struisvogel ei uit te voeren, tenzij als hierinna voorzien, naar eenige plek buiten de

limieten dezer Kolonie, of naar eenig land daarvan door de zee gescheiden: Mits echter dat deze verbodiging niet toepasselijk zal zijn op den uitvoer van eenigen Struisvogel of eenig Struisvogel ei naar eenige naburige Kolonie of Staat die, door haar of zijn eigen Wetgeving, gelijkerwijs den uitvoer van Struisvogels en Struisvogel eiers zal hebben verboden, onderworpen aan de voormelde vrijstelling, naar eenige naburige Kolonie of Staat, en op een straf niet minder dan die voorzien door deze Akte. En mits verder dat niets in deze Akte den uitvoer zal beletten van de doppen van Struisvogel eiers waarvan de inhoud verwijderd is, of van Struisvogel eiers die onvruchtbaar zijn gemaakt, mits dat in laatstgenoemd geval een permit om uit te voeren verkregen zal zijn van den ambtenaar door het Gouvernement voor dat doel benoemd.

3. Ieder persoon die de voorzieningen dezer Akte overtreedt door eenigen Struisvogel of Struisvogel ei uit te voeren (behalve als hierintevoren uitgezonderd) zal bij overtuiging onderhevig zijn aan gevangenisstraf met of zonder harden arbeid voor eenig tijdperk van niet minder dan twaalf maanden noch meer dan twee jaren.

4. Alle straffen onder deze Akte kunnen gehandhaafd worden in het Hof van den Magistraat der Afdeeling waarin de overtreding bedreven werd.

NITROGEN AS A FRESH-FRUIT PRESERVATIVE.—A new method of preserving fruit during shipment has been elaborated by Mr. Elward Cooper, State Horticultural Commissioner of California. At the Paris Exposition of 1900 there was exhibited a number of fish that had been preserved in nitrogen for seven years without decay; and, hearing of this, Mr. Cooper began to consider the possibility of supplying a suitable container at a low cost for the purpose of preserving Californian fruit during shipment to eastern markets. After much experimenting he has now succeeded in producing such a container. The container is a paper box treated with bitumen to prevent the entrance of oxygen from the outside atmosphere. After the box has been filled with fruit it is closed except for a small opening. A number of these boxes are placed in a steel cylinder from which the air is exhausted. The cylinder is then filled with pure nitrogen gas, and by means of an automatic device the boxes are sealed. The boxes are of a size to fit the wooden cases or crates in which fruit is ordinarily shipped. Mr. Cooper has packed pears, grapes, cherries, etc., in nitrogen, and taken them from the containers after five months in perfect condition. Fruit that was not in good condition when packed showed, when removed from the containers, that decay was arrested as soon as the oxygen was excluded.



INDIAN OATS AT THE WEENEN EXPERIMENT STATION.
Grown under Irrigation.

Alfred County Farmers' Association.

ANNUAL PRESIDENTIAL REPORT.

On Saturday, 26th October, the Alfred County Farmers' Association held their annual general meeting, in the Public Hall at Harding, when the President (Mr. A. G. Prentice, J.P.) read his annual report, as follows:—

"In presenting to you the third report of your Society, I have to congratulate the committee and members on the very successful show held in June last. At the commencement of the season it was thought that, owing to the presence of East Coast Fever in the Colony, the show would be a very poor one, and that cattle, at least, would have to be excluded from the prize list, but the very courteous and wise action of the present Minister of Agriculture, in adopting the suggestion of joining hands with the Cape in closing the Umzimkulu River to the ingress of cattle, enabled us to exhibit in this section as usual. The horses shown were more numerous this year, and the quality, with one or two exceptions, was excellent. The same may be said of the cattle, which were in far better condition than last year. Sheep, however, were not well represented, all the exhibits of woolled sheep belonging to one man. Considering that the wool grown in this district has for many years realised the highest price in Natal, I think that it is a pity there is not more competition in this section, and I hope to see all the pens filled at the next show. This display of agricultural and home produce in the new hall, which is the largest covered-in space on this side of Maritzburg, was most gratifying, and in this section we are far ahead of the Kokstad and Ixopo shows.

"At the half-yearly general meeting it was decided to build a produce hall, the money to be raised by debentures of £5 each, bearing interest at 6 per cent. Your committee accepted the tender of Mr. Field to erect a wood and iron building 80ft. by 25ft. for the sum of £247 16s. 6d., this, together with insurance and a few other expenses for fittings, etc., making a total of £266 4s. 9d. Debentures to the amount of £160 have been taken up, leaving a debit of £106 4s. 9d. I trust that the remaining twenty-one debentures will be taken up at this meeting, as it is necessary that the debt should be cleared off.

"I am sure that you all followed with keen interest the debate in the Legislative Assembly with regard to

OUR RAILWAY,

and I have no doubt that many of the statements made by Members in that House, and particularly the one that no definite promise had been given

that the line should be built, came as an unpleasant surprise to you, as it did to me. I have no wish to discuss this matter here in this report, leaving it rather with you to decide as to what action is to be taken in the future, but I would most strongly urge upon the farmers of this county the necessity, while waiting for the completion of the line, to develop the resources of the country, and so hasten its arrival. You have in this district a great source of wealth. I allude, gentlemen, to the

WATTLE INDUSTRY.

We have the assurance of Mr. Sim, the Conservator of Forests, and the Minister of Agriculture, that the red or chocolate-coloured soil of this Division is equal, if not superior, to the very best land in Umvoti County, and these statements are borne out, not only by the rapid growth of the trees, but also by the high price paid for the bark, so that, if every farmer would only plant a certain quantity of wattles—even if it were only in some cases to fill up odd corners of the farm—we should in a very short time compel the building of a line here.

“While on the subject of bark production, I would point out to would-be growers that wattles in this district will (if given thorough attention and thinned out when small to 6ft. apart) grow 10ft. in height in twelve months from the day of planting, and as much as £35 to £40 cash be taken from one acre when matured. Yet these advantages will be thrown away unless the bark is placed on the market in a perfectly sound condition. I appeal to all growers to try and do everything in their power to retain the splendid reputation this county at present enjoys for its bark.

“Your thanks are specially due to the Minister of Agriculture, not only for his far-seeing policy as regard this unfortunately situated portion of the Colony, but also for his unfailing readiness to give help where practicable. I sincerely thank the committee, and especially the secretary and treasurer, Mr. H. C. Hitchins, for their valuable assistance during the past year.”

People do not know, says the *Rural New-Yorker*, that drain tile is now made of concrete. In some sections where there is little or no clay, sand and cement are used to make tile, which are said to be superior in some ways to baked clay. The tiles are made in moulds, by hand, or in a machine which will turn out about 300 an hour.

Inanda Agricultural Association.

ANNUAL PRESIDENTIAL ADDRESS.

On the 23rd October the Inanda Agricultural Association held their annual meeting at Verulam, when the following report of the President of the Association (Mr. W. J. Thompson) was read and adopted:—

For the second time, as President of this Association, it is my privilege to present to you a report of the events during the past year.

DEPRESSION.

When presenting my last report we hoped for a revival of trade, but unfortunately our expectations have not been realised. We can only hope the coming year will be one of greater prosperity to agriculture and commerce, that the dark cloud of depression over South Africa will have passed away. I place agriculture and commerce together, as one without the other cannot possibly be prosperous, and any attempt to divide the two means disaster. There is no doubt the commercial community is suffering intensely through this depression, probably more than the agriculturist; their hope is that the agriculturist will follow the advice given by our present Prime Minister to produce more. If the farmers' spending power is limited, it is bound to affect commerce. Unfortunately, the spending power is limited through the many drawbacks the farmer and planter have to contend with. Notwithstanding the great losses, let us face the difficulty and do out utmost to produce more out of the soil.

SUGAR INDUSTRY.

This industry is still hampered and retarded in its progress by over-sea imports, and the reduction of protection from £5 to £3 10s. per ton on refined sugars. Australia will have a surplus of about 30,000 tons of sugar this year, and with the object of keeping up the price for the quantity used in that country, it is the intention of the two largest refining companies to send over here the greater portion of this surplus, the two companies standing between them any loss which may be sustained. This lowering of the duty on refined sugars means thousands of pounds loss to planters to support a Java product refined in Australia free of duty into that country, and also supported by a bounty. How is it possible to cope with such unfair competition? The duty should be re-imposed, otherwise young men who have leased land in the province of Zululand will have a difficulty in making the industry pay. The imports of sugar from January 1st to September 30th this year amounted to about 20 million pounds weight (10,000 tons). This huge importation is the direct result

of the unfair competition referred to. Natal sugar exported during the same period amounted to 4,589 tons.

AGRICULTURAL BANK.

The Government are to be complimented on bringing forward such a useful institution. It will be a strong helping hand, and will greatly assist in putting agriculture on a proper footing. An agricultural bank is the first necessity, and if managed efficiently will prove a great boon to the Colony.

LAND QUESTION.

Since my last report, the Legislature has made it optional with regard to the tenure of lands in the Province of Zululand, which can now be purchased in freehold. With regard to leasing, the objection, in my opinion, is to a great extent a matter of sentiment. One of the arguments was that it would be difficult to raise money on leasehold tenure, but the agricultural bank will now make this possible. The greatest objection to purchase will be the admission of land speculators. At the present time, as we are all well aware, the existence of the land speculator is one of the greatest drawbacks to the general welfare of agriculture, and I very much regret that the policy of leasehold tenure, which was apparently working well, has been altered. If the Colony were under a land improvement law, and the landowner compelled to show an improvement of his holding, there would not be so much idle occupation, and consequently not the same risk of Zululand being made the subject of speculation.

MEALIES.

Again, the Government are to be complimented in obtaining such favourable terms with the shipping companies with regard to freights for this export trade. There is a possibility for a regular outlet for our surplus stocks of mealies: London, Hamburg, and Australia are, I believe, open to take any quantity, but they must be of the very best quality to ensure a fair price, and, most important of all, must be properly graded. All grain is sold from sample, and nothing tells so much against it in big markets as mixed quality. There was a very important suggestion made by a member of the Government, when he pointed out that the mealies should be placed in new bags, as a clean new-looking sack shows the contents to so much better advantage. We know the quality of Natal mealies cannot be equalled, and with careful selection of seed and cultivation we shall be able to maintain this position. It may be three or four years before we get the full benefit of exporting, but, in my opinion, there is a great future for this industry. Our exports from January 1st to September 30th amounted to 176,130 muids. There is no doubt there was a shortage in the mealie crop; last summer was exceptionally wet, and the damage caused by locusts brought the crop much below the estimate.

FRUIT.

We all had great hopes that the fruit export trade would materially assist in bringing a return of prosperity to the Colony, but unless some radical change occurs in the returns obtained by growers here, there is not likely to be much more done in this direction. I give below the figures relating to ten shipments of naartjes from a farm in this Division, which are very discouraging, and would seem to indicate very excessive charges after arrival Home, seeing that we were led to believe that very fair prices were realised on the whole for Natal fruit.

The figures are as follows:—Received for 70,000 selected naartjes, £71 4s. 9d. Against this had to be charged: 70,000 wrapping papers at 2s. 9d. per 1,000, £9 12s. 6d.; 700 boxes at 6½d. each, £18 19s. 2d.; labour for picking and packing (reckoned at 1s. 4d. per day), £28; transport and N.G.R., £3; total, £59 11s. 8d.; leaving a balance of £11 13s. 1d., which works out at 4d per 100, a very disappointing result surely. Unfortunately, this is not an isolated case, but I understand that better results have been achieved from some consignments sent Home privately, and possibly from the experience gained this year more economical means may be adopted for placing the fruit on the Home market.

TEA.

This industry is steadily progressing, the tea improving both in quality and quantity manufactured. Several shipments sent to London have realised satisfactory prices.

WATTLE BARK.

A start on a fairly large scale has already been made in growing wattles in this Division, and I am informed that the Natal Estates, Ltd., also contemplate planting a considerable acreage.

FIBRE.

This is a new industry, from which very good results may be anticipated if it is taken up by planters. Fibre can be grown on lands which are quite unsuitable for other Coast products, and as the machinery for treating the leaf is, comparatively speaking, inexpensive, it would seem to promise well for the small farmer as well as for the larger estate owners. Mr. Leonard Acutt, who recently went to Mauritius for the purpose, has written a report on the industry, which I expect will appear in the *Agricultural Journal*. The Dalmeny Fibre Co., at Duff's Road, contemplate planting 600 acres at the rate of 200 acres a year for the next three years, planting at the present time being in full swing.

TOBACCO.

838,534 lb. of tobacco was exported during the nine months ended September 30th. There is to be an open competition for Colonial leaf

tobacco held in London in March next year, at which it is to be hoped all our local growers will compete. Samples of not less than 4 lb. weight should be sent, carriage paid, to reach London not later than March 15th, 1908, addressed to the Manager, Tobacco International Exhibition, 2, Monument Station Buildings, London. The manager of the exhibition will pay the duty and the samples will become his property afterwards, unless otherwise arranged. This should be a good opportunity to bring Natal tobacco before the Home purchasers, with benefit to the growers and the Colony generally.

EXPERIMENT FARM.

This farm at Stanger continues to do good work, as was proved by the annual report recently issued. Too much praise cannot be given to Mr. Addison for his untiring efforts in connection with this work. Members of this Association paid a visit to the farm a short time ago, and were well entertained by the managing committee. Everyone was pleased with the results shown, and many notes were made by planters present, which will no doubt prove of value when applied to their own work.

TICK FEVER.

The hope expressed by me last year that we might escape this terrible disease in this district has, unfortunately, not been realised. Owing to the strenuous efforts of the District Veterinary Surgeon, Mr. J. McNeil, and our hard-working Stock Inspector, Mr. J. Swales, the disease has not yet made its appearance in this division south of the Umhloti River, but in other parts of the Colony its ravages have been most severe, and, without question, this has had a very great share in preventing that return to prosperity which we are so anxiously awaiting. In consequence of representations made by this Association, that part of the Inanda Division between the Umgeni and Umhloti Rivers has been divided into zones in which cattle may move under permit, and this has relieved the situation to a great extent. The thanks of the Association are due to Messrs. T. Polkinghorne and W. W. Sykes for so ably representing us in the deputation to Government to obtain this concession. Much to our regret, Government found it necessary to dispense with the services of Mr. McNeil, the District Veterinary Surgeon. I would like to place on record the high opinion held of him by all stock owners in his district, and trust he may succeed in Durban, where he has started private practice. On behalf of the Association, I extend a welcome to his successor, Mr. Bruce, who has taken over the duties for this district.

LOCUSTS.

This scourge is again with us, and I fear to a greater extent than last year. Several swarms have already laid their eggs—quite a month earlier than has been their habit hitherto. Our only hope is for the whole of

South Africa to make a combined effort for their destruction. This is, of course, an enormous task, but it will have to be successfully tackled before agriculturists will have any feeling of security that they will reap what they have sown. In one district of the Transvaal alone, the loss caused by this pest was estimated at £219,000 during only one season.

AGRICULTURAL UNION.

We have been ably represented at the meetings of the Union by Messrs. C. Bishop and T. Polkinghorne. Mr. W. A. Campbell was elected a delegate, but was, unfortunately, prevented from attending by illness.

NEW MEMBERS.

Seven new members have joined the Association during the past year, and I would repeat the invitation given in my last report to residents in the Division to join us, and so add to our strength in considering the many questions that are dealt with by the Association.

ROADS.

The condition of the roads in the Inanda Division was dealt with by the Association, with generally satisfactory results, Mr. Head and Mr. Ralfe having been always willing to accede to our requests so far as lay in their power.

LIST OF PROPERTY-OWNERS.

The Association asked the Government to supply each Fieldcornet with a list of property-owners in their respective divisions, so as to enable them to compile a more complete voter's roll. Owing to financial considerations, Government could not comply with the request, but promised to consider the matter when circumstances allowed. I consider that the money this would cost would be well spent in the interests of the Colony, as under the present system the voter's roll is compiled in a more or less haphazard manner.

AGRICULTURAL SHOWS.

Owing to the continued depressed state of affairs generally, it was decided not to hold a show this year. I hope next year will allow of an effort being made to organise one, as such an event always causes a lot of friendly rivalry, which is bound to have a good effect on everyone concerned.

CROP STATISTICS.

The Association has to thank Messrs. T. Polkinghorne, J. Swales, R. Armstrong, and A. J. Harvey for obtaining statistics of estimated crop returns, in response to a request from the Minister of Agriculture.

"AGRICULTURAL JOURNAL."

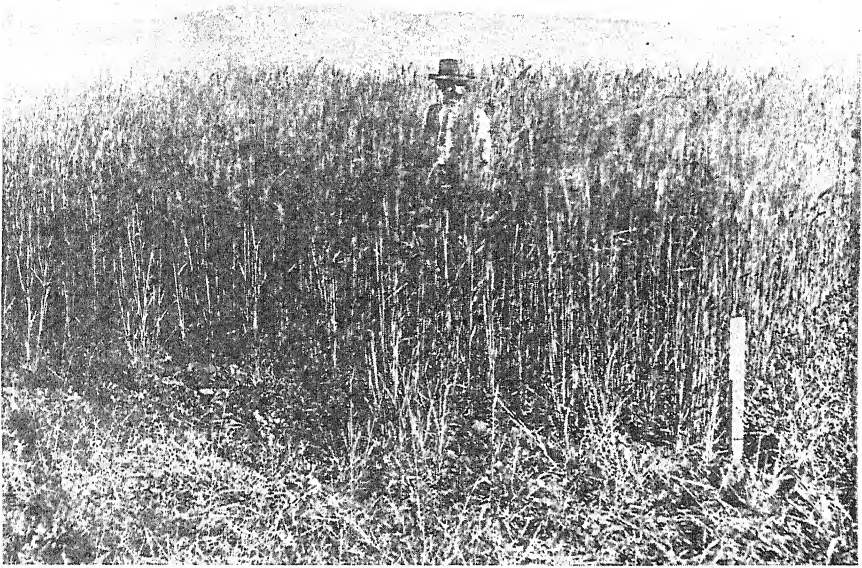
I would remind members of the low subscription at which this useful periodical is to be obtained, namely, 5s. per annum. Much valuable in-

formation is always to be obtained from it, and Government should be supported in their efforts to keep the agricultural community so well posted in matters concerning them.

IN CONCLUSION,

I would like to give a word of warning in regard to the danger it seems to me we are all in of being too downhearted as to our future prospects. It has been the history of the world that immediately after a war there is a period of unnatural inflation, followed by a corresponding period of depression. We are now suffering from the latter, but history again teaches us that a recovery always follows, and generally the country emerges wiser for the set-back. We know full well that we in Natal suffered from swelled head to an extraordinary degree; we took the fact that land in Durban was fetching such fabulous prices for a good sign, instead of reading it as a danger signal. We are paying for our folly now, but I think will profit by the lesson, as Australia has done. I do not think it wise to prophesy that there will be any immediate return to a high tide of prosperity, but I do think that business affairs generally are gradually getting on a better footing, and the element of rash speculation giving way to sounder business methods. My thanks are again due to Mr. J. H. Stansell for services rendered to me by him during my term of office. It has always been a pleasure to work with him, and I can only say that the Association will be very fortunate if it can retain his services for another term. To the representatives of the Press we offer our grateful thanks for the valuable services they have given to us so liberally. Finally, in vacating the office of president, I wish to thank members for their cordial assistance at all times so cheerfully rendered.

Soil may be easily tested in order to discover whether it requires lime by the use of blue litmus paper—which may be obtained at a chemist's. A fair sample of the soil of the field to be tested should be taken and put into a cup or glass, with just sufficient water to make it pack firmly. Then thrust a knife into this soil and put a piece of the litmus paper into the hole, pressing the soil firmly around it. Leave the paper there for about 15 minutes, and then remove it. If on drying the blue colour has changed to red it may be safely concluded that the soil is sour and needs lime.



RYE OF ARBRUZZI AT WEENEN EXPERIMENT STATION.
Grown under Irrigation.

Upper Biggarsberg Farmers' Association.

PRESIDENT'S REPORT FOR 1906-7.

THE following report has been submitted by the President (Mr. Geo. Langley) to the Upper Biggarsberg Farmers' Association:—

"In submitting the report for the year just closed, I regret having to state that, although we are out of debt the balance on the right side is only a very small one.

"Owing to the spread of East Coast Fever amongst cattle in the Division of Dundee, it was deemed advisable to discontinue the holding of cattle sales at Dannhauser, consequently our income has been very much reduced. Two small sales were held during the year, and good prices were realised for the stock sold.

"In the early part of the year the subject of slaughtering fat stock at this station was considered, but this proposal was dropped owing to the Government having partly arranged for the erection of abattoirs at Charlestown.

"The dreaded East Coast Fever amongst cattle has existed in the eastern portions of Dundee Division since August, 1906, but has not spread much in this direction owing to the restrictions placed on the movement of cattle and the number of fenced farms near the railway. A new Advisory Board for the district of Newcastle has been elected under the new Government regulations, and I represent this Association on that Board, which holds monthly meetings at this station.

"A new method of dealing with this disease will shortly be in operation, viz., the compulsory slaughtering of isolated, infected, and in-contact herds, together with the fencing of farms in diseased areas.

"This Association has continued to impress on the Government the necessity of adopting this stamping-out policy. Our local members of Parliament are now in favour of this measure, and I believe we are fortunate enough to have a Minister of Agriculture strong enough and able enough to carry it through to a finish. If this stamping-out process is persisted in, I think a large number of the cattle in the Colony will be saved, and business in general will improve when confidence is restored amongst farmers and the irksome restrictions are removed from ox-transport.

"Some of the members of our Association paid a visit to Cedara in March last, but owing to weather conditions were unable to inspect the experimental plots. The visit, however, was most instructive and enjoy-

able, the Director and his staff having done all in their power to make it so.

"At the yearly meeting of the Agricultural Union, you were represented by the Vice-President and myself. These gatherings are yearly increasing in importance, and I would urge this Association to make every effort to be represented at each yearly Conference.

"An attempt has been made to establish a co-operative creamery in Newcastle. You were represented on the professional Board of Directors by our Vice-President. Nothing has yet been accomplished, chiefly owing to the threatened invasion of East Coast Fever. A number of farmers in this district supply the Nel's Rust Creamery with produce, and this seems to indicate the necessity for a creamery in the Northern Districts.

"A Mealie Union is now in course of formation. Probably most of you have received circulars from Maritzburg inviting you to become members. The committee is a strong and capable one, but no district north of Howick seems to be represented. It is clear that some united effort must be made for dealing with our mealie crop, which is now generally in excess of South African requirements. The methods of cultivation and manuring has vastly improved during the last few years, consequently a much better yield per acre is obtained, not to speak of the increased area under cultivation.

"Stock of all kinds have done fairly well. Sheep farmers who relied solely on the grass burns came out with a very poor crop of lambs, but those who gave their ewes a little extra food were fully recompensed for their trouble. Vaccine supplied by the Veterinary Department for inoculation against blue-tongue in sheep has generally given good results; I anticipate that there will be a good demand for this preventative during the coming summer. Many of our farms will carry sheep all the year round if the blue-tongue scourge has at last been conquered. It is more profitable to export wool than mealies, and good mutton is always a scarce commodity in Natal during the summer months.

"The attention of the Minister of Lands and Works was called to the fact that a number of Crown land farms in process of alienation are not beneficially occupied. I trust this matter will not be allowed to drop until some of these farms are made available for young men who would be glad to purchase them and fulfil the conditions under which they were originally sold.

"We have been favoured with visits from the Minister of Agriculture, the Minister of Railways and Harbours, and the Minister of Lands and Works. These interviews have been much appreciated by farmers, and doubtless good results will be obtained from the representations made to these hon. gentlemen during their stay here.

"There have been ten meetings of this Association held during the year, all of which have been well attended. I trust your new President

will receive the same measure of support which has been accorded me during my term of office. As we are fortunate enough to have quite a number of members who are capable of discharging the duties of president, I trust one of them will be willing to come forward and do his duty by putting in a year's work for the benefit of his neighbours.

"In conclusion, I have to specially thank our late President, Vice-President, and Mr. J. H. Murray, our hard-working hon. secretary, for the willing and valuable assistance rendered me during the past year."

In moving the adoption of the report, Mr. Sutherland regretted that the President of the Association had omitted to make any reference to the good work done in the Division by the detective appointed on the advice of the Association for the detection of cases of stock thefts. Mr. Langley replied that this was an oversight, as he fully intended to have mentioned the matter.

"Owed" to the Land Board.

ON the occasion of the recent annual visit of the Land Board to Weenen the question of the arrear instalments due on the blocks was discussed at a public meeting of the settlers. Shortly after the meeting the following ode, dedicated to the Land Board, was handed to the Chairman:—

HAIL, Mighty Ones! I bow me to the soil,
On which I spend myself, my life, and toil.
I pray you harken to my humble prayer,
And let me off my just and lawful share
Of water rates. For lo! I cannot pay
A stiver on account: hence this dismay.

I owe the Board for four instalments still
Beside the water rates. The fearful bill
Haunts me by day, destroys my sleep by night—
I live and move in wild extremes of fright.
Onions and peas bring to my throbbing breast
No hope of income. All my trust I rest
On heavenly love, and in this humble prayer
I'll "Ode" the Board again, and call it square.

Experiment Farms.

CEDARA.

To DIRECTOR EXPERIMENT STATIONS.—

The planting season is now in full swing and all hands have been specially busy on their respective branches of work.

During the early winter months the question of working hours was under consideration, when it was then decided that, provided the necessary supervision of coloured labour, and attention to live stock were taken in turn, European employees and students could then be off duty on Saturday afternoons, on the full understanding that, on the revision of the summer working time table, the concession would cease and longer working hours would be required at planting and harvesting seasons. I am now pleased to report that the system has been appreciated by all concerned and is certainly more feasible and practical than abiding by a stereotyped time irrespective of the urgency or otherwise of work.

Since my last report the weather generally has been cold and not of a nature to encourage the growth of crops. The early planted mealies were checked for the want of heat. On a very few dates only has the thermometer exceeded 90 degrees, and the maximum then was 94 degrees, the mean for the month being 78 degrees. The rainfall for October was $2\frac{1}{2}$ inches. This was below the average in comparing the corresponding months of several previous years. For the month of November till date of writing—viz., 20th—over 4 inches have been registered. Of this, however, $2\frac{1}{4}$ inches fell during two thunderstorms of short duration, and obviously the heavy wash and flooding caused considerable damage generally and, unfortunately, on several sections of experimental work that had involved a good deal of labour and which will now have to be replanted, more particularly the Manure and Variety Sections of Sugar Beet. Several acres of ground that had been ridged out for experimental work was washed flat. The vle land which previously got water-logged with similar rainfalls very quickly cleared itself, as a result of the drains that have been cut.

Every effort is now being made to get a large area of mealies planted, and (as previous experience has proved) this must be completed by the middle of December. The check rowing system of planting is being adopted and a Deere planter used, 3 feet by 3 feet 8 inches, with three Kernels dropped in the hill. Special advantage will thus be gained in cross cultivating the crop.

A valuable consignment of pedigree maize on cob has been received

from Messrs. Funk Bros., America. The varieties were Yellow Dent, Golden Standard Leaming, and Boone County. The latter has been sent on to Winkel Spruit Experiment Station.

Prior to planting, and for future reference, the cobs were numbered consecutively, and photographed, as it will be interesting to follow the result of careful selection from the individual ears, the grain of each cob being planted separately.

Havoc is being done to young plants by cut-worms. The method adopted to kill them has been the use of a mixture of 1 lb. Paris green, 50 lbs. bran sweetened with treacle, strewn in handfuls over the infected ground. Unfortunately quite a large area was treated in this manner a few hours before a very heavy rain, which will now have rendered the preparation not so effective. However, if no appreciable result is likely to be shown the work will be repeated. Mealie top grub on the early planted crop is now much in evidence.

The working stock are healthy and in fairly good condition. The majority of mules recently received from the Transport Department were unbroken, but have now been trained, and a reasonable amount of work can be got from them. The Persian sheep are thriving well. Of the last lambing there are 16 ram lambs, some exceptionally good and true to breed. Several applications have been made for purchase when they are weaned. The poultry are healthy, and over 300 eggs were laid during the month. There are 211 chickens coming along well, and the incubators are still in use. A strip of ground adjoining the present runs is being ploughed, the fencing of which will be taken in hand as soon as possible to make it into a permanent chicken run.

The carpenter has been mainly occupied in the putting down of iron buildings, reconstruction, repairing, painting and papering several buildings. A good deal of the engineer's time was taken up in the early part of the month ploughing on the flat with the traction engine, and I wish to report most favourably on the class of work done. The students who were detailed for that work showed a keen interest.

I understand that the term of sentence on the convicts employed on the Farm will soon be up, and I hope arrangements can be made to replace them as they have proved to be a useful and reliable source of labour.

ALEXANDER REID,

Farm Manager.

CEDARA: FORESTRY SECTION.

TO DIRECTOR EXPERIMENT STATIONS.—

In response to your request for a report as to the effect upon the Cedara plantations of the severe frosts experienced during the past winter, I beg to submit a table which will show, at a glance, the position.

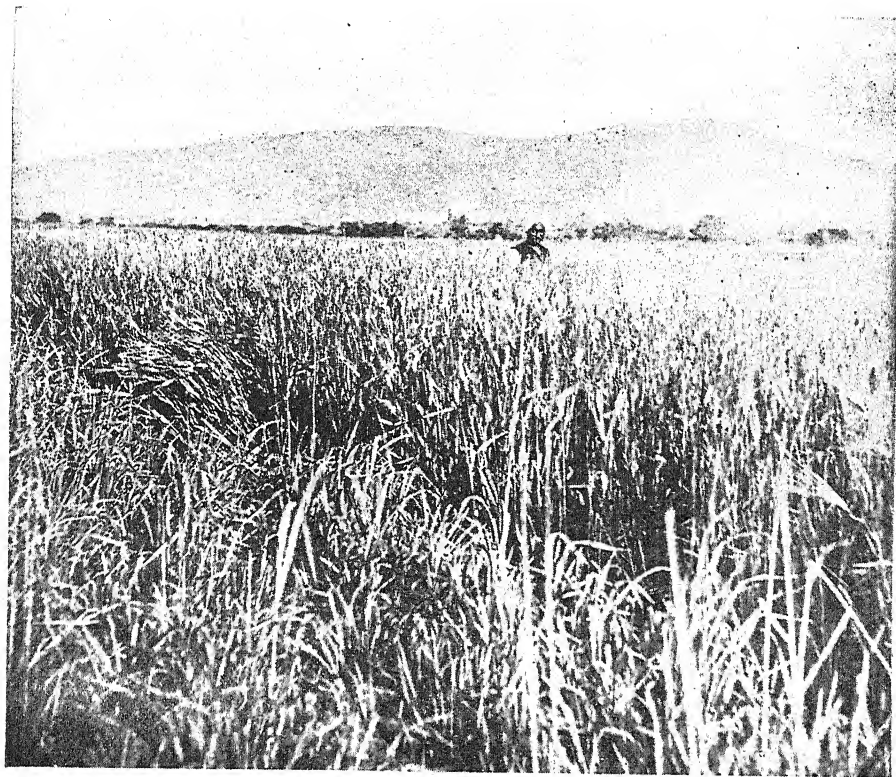
The columns of the table indicate as follows:—

- I. Killed entirely or injured beyond recovery.
- II. Cut to the ground but breaking well now.
- III. Cut back severely.
- IV. Cut back slightly.
- V. Injured in vleis but unharmed on higher ground.
- VI. Uninjured.

Species.	Date of Planting.	I.	II.	III.	IV.	V.	VI.
<i>Acacia melanoxylon</i> (Blackwood)	03						—
<i>Acacia mollissima</i> (Black Wattle)	03-06					—	
<i>Acacia pycnantha</i> (Golden Wattle)	06	—					
<i>Acer Negundo</i> (Box Elder) ...	06						—
<i>Alnus glutinosa</i> (Alder)	06						—
<i>Casuarina leptoclada</i> (Beefwood)	03						—
<i>Catalpa bignonioides</i>	06						—
<i>Callitris australis</i> (Oyster Bay Pine)	06			—			
<i>Celtis australis</i>	06			—			
<i>Cryptomeria japonica</i> (Japanese Cedar)	06						—
<i>Cupressus goveniana</i> (Goven's Cypress)	06						—
<i>Cupressus macnabiana</i>	06				—		
<i>Cupressus macrocarpa</i> (Scented Cypress)	06						—
<i>Cupressus sempervirens</i>	06						—
<i>Eucalyptus acmenioides</i> (White Mahogany)	04				—		
" " "	06		—				
" <i>amygdalina</i> (Giant Gum)	04						—
" <i>botryoides</i>	05						—
" <i>citriodora</i> (Lemon Gum)	03				—		
" <i>corymbosa</i> (Blood Wood)	06						—
" <i>corynocalyx</i> (Sugar Gum)	03						—
" " "	04			—			
" <i>crebra</i> (Narrow leaved Iron Bark)	06			—			

Species.	Date of Planting.	I.	II.	III.	IV.	V.	VI.
<i>Eucalyptus diversicolor</i> (Karri Gum)	03			—			
" " "	04			—			
" globulus (Blue Gum)	04						—
" ficifolia (Red Flowering Gum)	06	—					
" Gunnii (Cedar Gum)	03						—
" " "	04						—
" " "	06				—		
" haemastoma	04						—
" "	05						—
" hemiphloia (Grey Box)	03						—
" " "	05				—		
" " "	06				—		
" longifolio (Woolly Butt)	04						—
" leucoxydon	03						—
" "	04						—
" "	05						—
" macrorhyncha (Victorian Stringy Bark)	04						—
" maculata (Spotted Gum)	05	—					
" " "	06						—
" melliodora (Yellow Box)	04						—
" " "	05						—
" obliqua Stringy Bark)	03					—	
" " "	04				—		
" " "	05			—			
" paniculata (Torr Vale Gum)	05		—				
" " "	06		—				
" pilularis (Black Butt)	05		—				
" polyanthema (Red Box)	04						—
" punctata (Leather Jacket)	03				—		

Species.	Date of Planting.	I.	II.	III.	IV.	V.	VI.
<i>Eucalyptus rostrata</i> (Red Gum) ...	03				—		
" " " "	04				—		
" " " "	06				—		
" <i>saligna</i> ...	04				—		
" <i>sideroxylon</i> (Iron Bark)	03						—
" " "	04						—
" " "	05				—		
" <i>Stuartiana</i> (Apple Scented Gum)	05						—
" <i>Iceticornis</i> (Forest Red Gum)	04				—		
" " "	06						—
" <i>viminalis</i> (Manna Gum)	04						—
<i>Fraxinus americanus</i> (American Ash)	06						—
<i>Ginko biloba</i> (Maidenhair Tree ...)	06						—
<i>Grevillea robusta</i> ...	05	—					
<i>Lagunaria pattersonii</i> ..	06	—					
<i>Liquidambar styraciflua</i> (Sweet Gum)	06						—
<i>Liriodendron tulipifera</i> (Tulip Tree)	06						—
<i>Pinus canariensis</i> (Canary Is. Pine)	03				—		
" <i>halepensis</i> (Aleppo Pine) ...	03						—
" " " "	06						—
" <i>insignis</i> (Monterey Pine) ..	03						—
" <i>longifolia</i> ...	06				—		
" <i>massoniana</i> ...	06						—
" <i>montana</i> ...	06						—
" <i>pinaster</i> (Cluster Pine) ...	03-06						—
" <i>rigida</i> ...	06						—
<i>Sapium sebiferum</i> ...	06				—		
<i>Sequoia gigantea</i> (Mammoth Tree)	06	—					
<i>Syncarpa laurifolia</i> ...	04	—					



CAPE BARLEY AT WEENEN EXPERIMENT STATION.
Grown under Irrigation.

NOTE.—The *E. maculata* and *E. corymbosa* planted in 1906 were given a particularly sheltered site, these species being known to be tender.

On compiling this list I found some of the results to appear contradictory, so have verified them all by another visit to the plantations. I attribute the results not being entirely consistent to the very local nature of the frost.

T. J. STAYNER, Forester.

STANGER.

TO DIRECTOR EXPERIMENT STATIONS.—

The results of experiments conducted with sugar cane at this Station are now to hand, and most satisfactorily confirm the data secured at Winkel Spruit and published in the October issue of the *Journal*. It is to be noted that the latter were obtained from plantations situated on sandy, hill-side soils, while the Stanger experiments were organised in rich, alluvial-bottom lands. In both cases duplicate sets of plots reduce any possible margin of error to a minimum, and the resulting body of information should be applicable to cane cultivation in any soil and situation.

At neither Station has it been possible to demonstrate any considerable profit from the use of commercial fertilisers, as applied to the first two crops on virgin soil, which is satisfactory testimony to the natural fertility of all classes of coast soils. It remains to be shown, however, at what stage a process of exhaustion may become evident in unmanured lands, and also as to how far a progressive increase in total weight of cane and saccharose may be secured from the use of such fertilisers. An almost uniform increment from the first ratoon crop is to be observed, and, in the case of the Winkel Spruit experiments, a marked shortening of the growing period. The latter feature raises the important point of the possibility of securing an annual instead of a biennial crop through the medium of stimulating fertilisers. A continuation of the present experiments upon the same lines will be necessary to the solution of these problems.

The highest absolute yield secured from manured plots was at the rate of 37 tons 1,787 lb. per acre, as compared with 35 tons 1,258 lb. obtained from the adjoining unmanured plot. This increase was secured by a medium dressing of a complete fertiliser containing nitrogen, phosphoric acid and potash, to which was added approximately half a ton of lime. The cost of this application would, of course, far outweigh the value of the immediate additional yield, and it remains to be seen whether the residual effects will reduce to any considerable extent this marked disparity. The omission of any constituent of the complete manure had

UBA CANE MANURES.

Plots 24 feet x 145 feet = 2|25 lbs of an acre. Average yield Unmanured Plots = 32 tons 1,473 lbs.

Plots.	Manures.	FIRST SET—Planted 4th Jan., '04.				SECOND SET—Planted 7th Jan , '04.				Plot.	Average : Tons per Acre.
		Cut Dec. 4th, '05.		Cut Sept 12th, '07.		Cut Nov. 14th, '05.		Cut Sept, 14th, '07.			
		Lbs. per Plot	Tons per Acre.	Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.		
48	No Manure	2,049	25 1,225	3,424	42 1,600	2,251	28 275	lbs, 1/2 B	32 367		
49	{ 120lbs. Sulphate of Ammonia 60 „ Dble. Superphosphate 50 „ Chloride of Potash 1125 „ Lime } per ac.	4,520	28 500	4,472	27 1,900	4,494	28 175	67	28 192		
50	No Manure	3,788	23 1,350	3,864	24 300	4,505	28 312	68	25 654		
51	{ 240lbs. Sulphate of Ammonia 120 „ Dble. Superphosphate 100 „ Chloride of Potash } per ac.	4,635	28 1,937	4,166	26 75	4,641	29 12	69	28 8		
52	{ 360lbs. Sulphate of Ammonia 180 „ Dble. Superphosphate 150 „ Chloride of Potash } per ac.	5,361	33 1,012	4,060	25 750	4,918	30 1,475	70	32 1,690		
53	No Manure	4,460	27 1,750	3,510	21 1,875	4,168	26 100	71	28 1,781		
54	{ 120lbs. Dble. Superphosphate 100 „ Chloride of Potash } per ac	4,436	27 1,450	3,804	23 1,550	4,841	30 512	72	31 1,978		
55	{ 240lbs. Sulphate of Ammonia 100 „ Chloride of Potash } per ac.	4,741	29 1,262	4,532	28 650	4,762	29 1,525	73	31 1,825		

Cut for Planting.

56	No Manure	...	...	4,472	29	1,900	5,244	32	1,550	4,524	28	550	5,884	36	1,550	74	31	887
57	} 240lbs. Sulphate of Ammonia 120 ,, Dble. Superphosphate	{ per ac. Superphosphate	...	4,655	29	187	5,480	34	500	4,748	29	1,350	5,968	37	600	75	32	1,159
58			...	4,390	27	875	5,516	34	950	4,196	26	450	6,032	37	1,400	76	31	1,419
59	No Manure	...	...	4,172	26	150	5,504	34	800	4,959	30	1,987	6,330	39	1,125	77	32	1,515
60	300lbs. Basic Slag	...	...	4,377	27	712	5,652	35	650	6,125	38	562	6,126	38	575	78	34	1,625
61	300lbs. Bone Dust	...	...	5,308	33	350	6,150	38	875	6,062	37	1,775	5,995	37	937	79	36	1,484
62	No Manure	...	...	4,395	27	937	6,220	38	1,750	5,614	35	175	6,338	39	1,225	80	35	522
63	} 256lbs. Nitrate of Soda 120 ,, Dble. Superphosphate 136 ,, Nitrate of Potash	{ per ac. Superphosphate	...	4,205	26	562	6,765	42	562	5,714	35	1,425	6,054	37	1,675	81	35	1,056
64			...	4,946	30	1,825	6,568	41	100	6,613	41	662	3,064 ($\frac{1}{2}$ plot)	38	560	82	37	1,787
65	No Manure	...	...	4,705	29	812	6,324	39	1,050	6,073	37	1,912	Cut for Planting			83	35	1,258
66	} 120lbs. Dble. Superphosphate 1125 ,, Lime	{ per ac. Superphosphate	...	4,736	29	1,200	6,112	38	400	6,437	40	462				84	36	21
$\frac{1}{2}$ B	No Manure	...	...	3,392	42	800	3,252	40	1,300	3,193	39	1,825				$\frac{1}{2}$ B	40	1,975

GREEN NATAL CANE MANURES. LOUSIER CANE MANURES.

Plots 24 feet × 145 feet = 2/25ths of an acre. Rows 6 feet apart. Sets 4 feet apart.

No of Plot.	Manures	Planted January 14th, 1904.				Planted January 20th, 1904.				No. of Plot.					
		Cut Nov. 14th, '05.		Cut Sept. 6th, '07.		Cut Nov. 13th, '05.		Cut Sept. 16th, '07.							
		Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.						
½ B	No Manure	1,500	18	1,500	984	lbs.	12	600	lbs.	12	1,150	1,540	19	500	½ B
85	{ 240lbs. Sulphate of Ammonia 120 „ Double Superphosphate 100 „ Chloride of Potash } per acre	3,104	19	800	2,684	16	1,550	1,619	10	237	3,711	23	387	91	
86	No Manure	4,253	26	1,162	3,015	18	1,687	1,510	9	875	1,966	12	575	92	
87	{ 240lbs. Sulphate of Ammonia 120 „ Double Superphosphate } per acre	3,888	24	600	3,267	20	837	1,326	8	575	2,963	18	1,037	93	
88	120lbs. Double Superphosphate, per acre	2,339	14	862	2,719	16	1,987	3,028	18	1,850	3,738	23	725	94	
89	No Manure	2,135	13	687	2,872	17	1,900	3,413	21	662	2,478	15	975	95	
90	300lbs. Basic Slag, per acre	1,996	12	950	2,648	16	1,100	2,372	14	1,650	2,427	15	337	96	
½ B	No Manure	1,032	12	1,800	1,753	21	1,825	779	9	1,475	784	9	1,600	½ B	

little effect in decreasing the yield, and the individual influences of single manurial constituents almost escape recognition. Pending the completion, therefore, of further stages in the experiment, it is impossible, in the light of results secured from two stations and four distinct sets of plots, to advocate the employment of high-priced fertilisers for sugar cane on the Natal coast. The attention of planters can more profitably be devoted to the question of a reduction in cost of production by way of labour-saving devices for the cultivation and harvesting of the crop.

UBA CANE: DISTANCE OF PLANTING.

Manures: 200lbs. Concentrated Superphosphate per acre, 2-3rds broadcast, 1-3rd in rows

No. of Plots.	Distance of Rows Apart.	Distance of Sets Apart.	Cut Dec. 4, 1905.		Cut Sept. 9, 1907.	
			Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.
$\frac{1}{2}$ B	...	...	2,825	35 625	Plant'd	
97	5 feet	3 feet	4 946	30 1,825	"	
98	"	4 "	4,980	31 250	2,062 $\frac{1}{2}$	25 1 550
99	"	5 "	4,205	26 562	4,136	25 1 700
100	"	6 "	4,252	26 1,150	4,470	27 1,875
101	6 feet	3 "	5 692	35 1,150	6,020	37 1,250
102	"	4 "	5 471	34 387	6,025	37 1,312
103	"	5 "	4,605	28 1,562	6,193	38 1,412
104	"	6 "	4,451	27 1,637	5,461	34 262
105	7 feet	3 "	5,783	36 287	6,149	38 862
106	"	4 "	5,552	34 1,400	6 368	39 1,600
107	"	5 "	5,231	32 1 387	5 852	36 1,150
108	"	6 "	4,707	29 837	5 267	32 1 837
$\frac{1}{2}$ B	...	...	1 985	24 1 625	2 388	29 1 700

GREEN NATAL CANE: DISTANCE OF PLANTING.

*Manures: 200lbs. Concentrated Superphosphate per acre, 2-3rds broadcast, 1-3rd in rows.
4 Rows in each Plot.*

No. of Plots.	Distance of Rows Apart.	Distance of Sets Apart.	Cut Nov. 5, 1906.		Cut August 5, 1907.	
			Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.
$\frac{1}{2}$ B	..	...	2 882	36 lbs. 50	Cut for Planting in Zululand.	lbs.
109	5 feet	3 feet	6,229	38 1,862		
110	"	4 "	5,282	33 25		
111	"	5 "	5,768	36 100		
112	"	6 "	6 304	39 800		
113	6 feet	3 "	7 573	47 662		
114	"	4 "	7 307	45 1,337		
115	"	5 "	7,678	47 1,975		
			Cut Nov. 4, 1905.		Cut Sept. 7, 1907.	
116	"	6 "	3,185	19 1,812	4,585	28 1,312
117	7 feet	3 "	3,646	22 1,575	4,890	30 1,125
118	"	4 "	3 340	20 1,750	5,954	37 425
119	"	5 "	3 346	20 1,825	4,794	29 1,925
120	"	6 "	2 827	17 1,337	4,247	26 1,087
$\frac{1}{2}$ B	...	...	1,499	18 1,475	2,470	30 1,750

The highest absolute yield from the "Distance of Planting" experiment was secured from a plot in which the rows were spaced at 7 feet and the sets 4 feet apart in the rows. The average return from the 6 feet rows was 34 tons 621 lb., and from the 7 feet rows 35 tons 170 lb., per acre. Economy in labour would further recommend the latter spacing. Even the lighter yielding Green Natal cane apparently benefits from the larger feeding area afforded by six and seven foot sowing.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

The weather throughout the past month has not been very favourable for harvesting the various crops. Rain fell on eleven days, and the total for the month was 2.04 inches. Considering the weather, however, I am glad to say that all crops harvested have been taken off the land in very fair condition. Section A, Indian oats (Quantities of Water Experiments)—these are to be threshed at the Weenen Steam Mills at the earliest opportunity, and a report furnished;—Cape barley, also intended for seed; and half plots of Algerian oats harvested for forage and baled, the balance being left for seed.

The Lucerne Cultivation Plots and Drainage Experiment Section have been harvested, and good results secured from this first cutting.

A crop of barley wheat has also been taken off and promises a fair yield of clean grain. This is the earliest by some six weeks of the thirteen varieties of wheat grown at the Station. Other varieties, however, will be found more profitable.

The field of onions planted out last month has made very good growth.

I have transplanted about 4,000 tobacco plants for cigarette leaf, and about 5,000 for pipe leaf, the weather not being favourable for extensive planting during the month, but every effort will be made to push on with this work whenever a favourable opportunity occurs.

Land has been prepared for the reception of the twenty-two varieties of cotton seed now to hand.

The members of the Land Board visited the Station during their tour of inspection during the month.

W. HOSKING,
Curator.

WEENEN.

REPORT FOR SEPTEMBER AND OCTOBER.

During the month of September the principal work carried out on the Orchard has been as follows:—

Ploughing and planting beans (common kafir) in Section 1. The beans were broadcasted on the land after ploughing, and harrowed in. In a month or two these beans will be ploughed in as a "green manure." In February the land will be again planted with Canadian Wonder beans which will be allowed to seed, as the latest part of the summer is the best time to grow beans for seed. The ploughing-in of the beans will greatly improve the condition of the soil for the trees, adding both nitrogen and humus, which are both very necessary in an orchard. Humus is very necessary here, as the soil is still raw and inclined to cake after irrigation.

Two pounds of superphosphate have been applied to each tree in Sections 5, 6 and 7. The manure on Section 5—"Uncultivated,"—was applied to the surface on a damp day and slightly raked. The manure on Sections 6 and 7 was applied in a circle around the tree and forked in.

The cultivator has been kept going among the trees and all weeds close to the trees hoed out by hand.

The main work during October has been hoeing to keep down weeds and the cultivating of strawberries, etc. The early crop of strawberries has been a failure this season, very little fruit setting on the plants. I believe the reason for this was that we have had several very hot, dry winds which seemed to scorch the flowers and prevented the fruit from setting. If the plants could be mulched with a good thickness of straw, I think the flowers and fruit would be protected from the scorching effect of the reflection of the sun's rays off the light-coloured soil. The strawberry plants are large and healthy and are now flowering again, and I hope the main crop will be better than the early one.

Section 4 and the Citrus Sections have been ploughed and Section 5 hand hoed. This latter section takes a lot of time to keep clean. There is a very noticeable difference already between Section 5 (just cultivated sufficiently to keep down weeds) and Section 6 (which is frequently cultivated). The trees in Section 6 are much larger than those in Section 5.

I have been busy with summer pruning and thinning fruit. Some of the Japanese plums required a lot of thinning, especially the unpruned trees in Section 2, which would have suffered severely from the weight of the fruit had they not been thinned.

Many of the peaches have a fair quantity of fruit on, as also have a few apricots, which are close on ripening.

The trees in general have made fairly good growth. The vines are looking well and some of the varieties are carrying a few bunches of grapes each. So far there have been no signs of anthracnose, owing, no doubt, to the two sprayings of Bordeaux mixture, one of which was applied in the autumn and the other in the spring just before the buds burst into growth. I have noticed vines belonging to one of the settlers here suffering badly from this fungus.

On the 29th inst. the members of the Land Board, accompanied by the Prime Minister, looked over the Orchard.

T. R. M. POLE,

Orchardist.

WINKEL SPRUIT.

To DIRECTOR EXPERIMENT STATIONS.—

With the exception of 30 or 40 tons left for planting purposes, all of the cane was cut and trucked to the mill and to planters, the total amount dispatched being 556,618 lbs., or 278½ short tons. The results



BARLEY WHEAT AT WEENEN EXPERIMENT STATION.
Grown under Irrigation.

from the Distance of Planting Uba cane varied very little from last year's results, the total difference from the whole section being only 137 lbs. Appended are the results for the two seasons for comparison:—

DISTANCE OF PLANTING UBA CANE.

Plots.	Area.	Feet between Rows.	Feet between Sets.	Cut January, 1906.		Cut September, 1907	
				I.bs. per plot.	Tons per acre.	Lbs. per plot.	Tons per acre.
$\frac{1}{4}$ B		5 feet	3 feet	948	28 $\frac{1}{2}$ lbs. 1,880	1,481	48 $\frac{1}{2}$ lbs. 860
73	$\frac{1}{16}$ of an acre.	" "	" "	4,120	30 1,800	4,513	33 1,695
74		" "	4 "	4,811	36 165	4,731	35 965
75		" "	5 "	4,880	36 1,200	4,253	31 1,795
76		" "	6 "	4,954	37 310	4,312	32 815
77	$\frac{2}{32}$ of an acre.	" "	3 "	5,853	36 1,162	5,378	33 1,225
78		" "	4 "	4,123	25 537	5,044	31 1,050
79		" "	5 "	5,001	31 512	5,169	32 612
80		" "	6 "	4,921	30 1,512	5,096	31 1,700
81	$\frac{4}{16}$ of an acre.	7 "	3 "	5,853	31 920	6,198	33 628
82		" "	4 "	5,500	29 1,125	5,497	29 1,092
83		" "	5 "	5,545	29 1,609	5,228	28 201
84		" "	6 "	4,859	26 239	4,518	24 568
$\frac{1}{4}$ B		" "	3 "	1,062	22 1,666	1,149	24 1,407
Total yield				62,430 lbs.		62,567 lbs.	

Results tabulated from the Green Natal and Lousier canes show a marked decrease from the ratoon crop. It is very evident that light, sandy soils are not suitable for these canes; and, as arranged with you, an experiment will be carried out on dark, heavy soils.

The usual farm work is progressing very satisfactorily. Two teams are continually ploughing. Weeds are growing very fast, having had a good start owing to all hands attending to the cane-cutting, etc.

Asparagus and rhubarb plants were transplanted into permanent beds and are making fair growth. The onions have every appearance of returning an excellent yield.

Most of the trees have been pruned in the orchard; and land is being prepared for planting 5,000 more pineapples.

The oxen, though constantly working for the past three months, are in good condition and show little signs of lagging.

The three students now stationed here are giving entire satisfaction.

Two varieties of barley were harvested during the month, viz., Smyrna and Cyprus. The former Menesuien gave a good yield of grain, but the grain is rather dark, while the Cyprus, giving a lighter yield, is a good, sound, well-formed seed, of a good colour.

W. JOHANSEN,
Manager.

Gardening Notes for December.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

THE main sowing of cauliflower should be put in this month for planting out in February. The two best varieties for Natal are the well known Veitch's Autumn Giant and Early London. With high cultivation the first-named variety can be grown to an enormous size. Specimens have been grown in this Colony weighing 24 lbs. and of fine quality. The seed bed should be well prepared before sowing and the soil enriched with well-decayed manure dug in and thoroughly incorporated with the soil. Sow the seed thinly and evenly and shade immediately with some kind of litter such as hay or straw. If the seed has been sown too thickly it will be a good plan to prick out the young seedlings when about two weeks old on to another well-prepared bed, leaving sufficient space between to allow of each being lifted with a ball of soil when large enough to be planted out. By this method healthier and stronger plants are produced than when planted out direct from a crowded seed bed. Water the bed twice a day, morning and evening, in dry weather.

If cabbage aphid appears, use a little lime in the water occasionally—the common Colonial lime that has been well slaked, not fresh stone lime, which is too strong and will burn the leaves.

If celery has not been sown it should be put in at once, as it is very slow during the seedling stage and requires quite three months from sowing before the young plants are strong enough for planting out. Whatever shading has been provided for the celery bed must be removed in dull and wet weather, but replaced again on hot days until the seedlings are strong enough to withstand the heat, as, until this stage has been reached, a few hours of hot sunshine will wither them up past recovery.

A later sowing of tomato may be made this month for succession, and where there is little or no frost in winter further sowing may be continued during January and February.

Sow also for succession French beans, cabbage, carrot, beet, lettuce, radish, onion, leek, mustard and cress.

One of the finest lettuces to grow now is "Webb's Wonderful." Sown in rich soil and planted two feet or more apart, immense heads can be obtained quite as tender as the smaller sorts.

Stake and tie up tomato plants as required, and when the fruit has set give occasional doses of liquid manure. If extra fine fruits are required, pinch out the laterals and disbud freely.

FLOWER GARDEN.

All the tender varieties of flower seeds may still be sown this month for flowering in March and April, such as Balsams, Cockscomb, Portulaca, Marigold, Sunflower, Cosmos, *Centaurea Americana*, Nasturtium, Zinnia, etc. Sow also Aster, Phlox, Dianthus, Candytuft, *Chrysanthemum tricolor*, Calandrinia, Carnation, Coreopsis, Heliopsis, Hunnemannia and Helichrysum, Gaillardia double and the large single perennial.

Carnation seed should be sown in tins or shallow boxes, well drained, using good soil. A large proportion of fine double flowers may be obtained from Douglas's Selfs and Fancies, which if sown now will bloom next spring and early summer. The young seedlings should be pricked out a few inches apart into other boxes or a small bed from which they may be finally planted out when large enough. The Everblooming Malmaison Carnation should also be sown now for spring flowering. This is a fine strain, and will produce a large quantity of sweetly scented double flowers of all shades.

The *Centaurea Americana* is a grand acquisition to the list of garden flowers, and is very easily grown from seed, which should be sown at once. In good soil it will grow four or five feet in height, producing large rosy lilac flowers in profusion on long straight stems, and is therefore good for cutting.

The Calandrinia is another flower seldom seen in Natal gardens. The flower resembles a Portulaca, but is borne on stems 9 or 12 inches long. Colour, rosy lilac; and very free flowering.

Violet roots for winter flowering may be planted this month. The most useful varieties are The Czar—single blue and white;—Princess of Wales—single pale blue;—Kaiser Wilhelm—large single purple;—Neapolitan—double lavender;—Swanley White—double white. Dig out a trench and fill in with good soil and well decayed manure, and plant 9 or 12 inches apart.

The herbaceous border should be well attended to this month. Give liquid manure to Perennial Phlox, Pentstemons, Cannas, Rudbeckias, etc., that are beginning to bloom.

Plant out Chrysanthemums in rich soil and mulch the surface round each plant with old manure. There is nothing checks them so much as hardening of the soil about the roots caused by the frequent watering required in dry, hot weather. Moreover, with a good mulch less watering is required as the moisture is conserved.

Plants of the beautiful *Mina lobata* should be put in now for autumn flowering. This is a grand creeper for verandah trellis or porch, and with a warm aspect will continue to flower all the winter.

The *Bignonia Venusta* (Golden Shower), also a winter bloomer, may be planted now.

All kinds of evergreen fruit trees should be planted without delay, such as orange, naartje, lemon, lime, loquat, guava, etc., also evergreen fence plants such as Thuja, Japan Privet and Eugenia. For fences these are usually planted half a yard apart.

Correspondence.

A VETERINARY QUERY.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Can you kindly inform me what is best to be done in the following case:—

I have a black horse, in good condition, but do what I will I cannot cure the hair falling off his face and head. For some time I have used paraffin and castor oil, and several times I thought he was cured! Hair restarted, but it comes on again very suddenly—first showing a dirty face and next day the hair is all off again. Otherwise his coat is splendid. I have washed the stable out with Little's dip, but without success.

Thanking you in anticipation,—Yours, etc.,

S.

[The above letter was referred to the Chief of the Veterinary Division (Mr. W. M. Power), who furnishes the following note:—

An ointment composed of the following—tinct. iodine, 1 drms.; mercury ointment, strong, 2 drms.; and vaseline, 2 ozs.—should be applied three times in one week and washed off the following day after each dressing with a little warm water to which a little sheep dip has been added. Manger, headstalls, bridles, etc., should also be thoroughly disinfected.

Treatment on these lines has been found most effective in many cases of this disease.]

STEAM PLOUGHS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In view of the possibility of East Coast Fever denuding the country of oxen, I wish to gather all the information necessary before purchasing a steam ploughing outfit, and will be glad if you could kindly give replies to the following questions:—

- (1) What is the best type of engine and plough?
- (2) What is price of same and working cost?
- (3) Can engine be used for ordinary traction purposes?
- (4) What is ploughing capacity per day?
- (5) Can deeper tillage be done than with the ordinary ox plough?—

Yours, etc.,

"WEENEN."

[There are two entirely different systems of steam ploughing, each of which has its advocates. The first system is that in which the engine or engines remain stationary whilst the plough is hauled across the ground by means of a steel cable. In this system, again, there are two variations: either one or two engines may be used. In the former case the one engine hauls both ways by means of an anchored pulley at the other end of the furrows. The second system is that known as direct traction.

For a hilly country like Natal, the cable system is undoubtedly the better one, the two-engine type being preferable to the single-engine. The initial expense is, of course, heavy. For example, a set of two engines (including 1,800 yards of steel cable) would cost about £2,800; a 4-furrow (say) balance plough would run into about £200; a cultivator, with nine and eleven tynes, would also cost about £200; and a harrow about £140. In addition, a watercart, with hand-pump and suction and delivery pipes, would run into about £70. As regards working expenses, the wages of a chargeman, an engineer for each engine, and one or two natives, must be taken into consideration, in addition to purchase of coal and transport of coal and water. These latter expenses, of course, will vary with circumstances.

For the direct traction system, an engine will cost, roughly, from £700 to £900 or more. There are several direct traction outfits at work in different parts of the country; and on ground which is firm enough to furnish a firm track for the engine, they work satisfactorily.

The engines in either system can, of course, be used for ordinary traction purposes, and may also be used stationary.

It is difficult to state anything definite as regards ploughing capacity per day, as everything depends on the nature of the ground. As regards the cable system, it is stated that 20 to 30 acres per day can be done "under favourable conditions with the tackle in perfect order." Tillage

can, of course, be done far deeper than with the ordinary ox-plough; and this fact constitutes one of the great benefits of ploughing by steam power. Ploughs are made to work to a depth of 30 inches; and, owing to the deeper loosening of the soil and to the excellent preparation of the surface, the injurious effects of drought or excessive rain are considerably obviated.—Ed.]

POTATO-GROWING EXTRAORDINARY.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In the September number of the *Journal* an example of "Potato-Growing Extraordinary" was given, but I think a crop of potatoes I reaped last January exceeded the one obtained by Mr. Konig-kramer.

I had $2\frac{1}{4}$ acres of ordinary land turned over in September, 1906, and gave it a good dressing of kraal manure. I then ploughed the land again, drilled it—drills 2 feet apart,—and planted the seed ("Up-to-Date"). Some of the seed was cut; and the distance apart was two feet. The drills were closed with the harrow, turned upside down. I ran the weeder over the field twice every day till the potatoes were up, and then scarified them; and, when high enough, they were earthed up, also with the scarifier. On January 28th, 1907, I started getting the potatoes up, using a potato-digger, and the total I got from the field was 221 bags. As to size and weight, I don't think they could be beaten, the average weight being $1\frac{1}{2}$ lb. each, the smallest potato being $\frac{3}{4}$ lb. and the largest $2\frac{1}{4}$ lbs. I have plenty of witnesses to prove this.

As to the question whether potato-growing pays: I sent 150 bags of those potatoes to the market, and they realised 2s. 3d. per bag. Expenses were: Sacks, 7d. each; rail, $5\frac{3}{4}$ d.; transport, 9d.—total, 1s. $9\frac{1}{4}$ d., besides dues and commission, seed, and labour. This speaks for itself. I send no more potatoes away, nor have I planted any since.

At the same time, I also planted a field—three acres of vlei land—with "Early Rose," using potato fertilizer as manure, but owing to heavy rains they were all swamped.

You are at liberty to publish this.—Yours, etc.,

P. WERNER.

Grovehurst Park,
Beaumont.

P.S.—I forgot to mention the quantity of seed: Eight bags of "Up-to-Date" were planted. Potatoes were small; the larger ones were cut. There was no hand-hoeing, and the scarifying and earthing up I did myself. I also worked the digger.—P.W.

WOOD ASHES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Can you inform me through the medium of the *Agricultural Journal* what the fertilising value of a ton of wood ash is? What quantity should be applied for a dressing on average poor land? What would be the most suitable crops to fertilise with ashes? Would the benefit of applying wood ash to light, sandy soil be equal to applying it to heavy vlel land? Thanking you in anticipation,—Yours, etc.,

"MOOI RIVER."

Mr. E. R. Sawyer (Director of Experiment Stations), to whom the above letter was referred, replies:—

Unleached wood ash may be regarded as a valuable potash manure, containing from 3 per cent. to 7 per cent. of this ingredient in a form which is readily available for the use of plants. Higher percentages of potash are obtained from young sap-wood and leaves than from mature timber. Coal ash is practically worthless as a source of potash. Wood ash also contains about 2 per cent. phosphoric acid and some 30 per cent. lime, and has a consequent approximate value of £2 19s. per short ton, calculated on the average unit values adopted for fertilisers sold on the Natal market (*vide* Bulletin No. 12, 1906). Ten times the quantity of wood ash would be required to secure results approximating to those obtained from a given dressing of the chloride (muriate) of potash, and as 100 lb. per acre of the latter fertiliser has often been found an economic application, 1,000 lb. of wood ash could probably be profitably employed in most cases. The ash has a further beneficial effect in obviating the attacks of insect pests to which it is markedly noxious, and both in this connection and from the manurial standpoint is particularly suitable for employment with tobacco, potatoes, legumes, and such cruciferous crops as cabbage and cauliflower. Leachin is less rapid and residual effects are more marked in a clay soil than in sandy loams, and the lime content of the ash exerts an opening and flocculating action on stiff lands.

APICULTURE: A RISING INDUSTRY.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—It is a great source of pleasure to me to see what gigantic strides bee-culture has made in this Colony within the last few years. Where a few people kept a hive or two for the purpose of providing honey for their own table, there are now hundreds who keep apiaries on quite a large scale, and are buying up all kinds of cans and jars to fill with honey for Natal consumption.

The old "milk box" home-made hive is now going out of date, and giving place to up-to-date modern hives. I can quite understand this, and am confident that the bee-keeper who has tried one of these hives would never go back to the old antiquated bee-smothering box hive, in which you get pollen, brood and honey in one confused mass. I personally have never used one of the home-made hives, but I was present one day at the opening of one owned by an apiarist who had never tried frame hives. On opening the hive, he had to cut away the combs from the roof, and slice off the layer of comb containing the honey, after which operation he calmly dropped each comb—shining with honey as it was—pellmell into the box, thus killing and smothering scores of bees, as well as damaging the young brood. He seemed quite happy and contented with himself. I advised him to get a Danzenbaker hive from Steel, Murray & Co., which he did, and he is now gradually replacing all his boxes with Danzenbaker hives. Needless to say, he gets more honey and more money.

Many beginners in bee-culture are troubled and disheartened by a new swarm clearing out of a new hive a day or so after "living," even though the queen's wings are clipped. This can easily be righted by tacking a strip of queen-excluder zinc over the entrance. The bees will probably swarm out, but the queen is caged, and the swarm is bound to return to her, and will eventually settle down to work. I know of many beginners who have lost their first swarm by trusting solely to the queen's clipped wings, but it is a well known fact that bees will carry their queen away bodily, even though her wings be clipped.

I should be glad if any of your many readers would kindly give us their experience of growing

BUCKWHEAT FOR BEES.

The Americans are great advocates of this plant as a honey producer. I have sown a patch as a trial, and it is now in full bloom. I am watching it carefully, but it seems rather a failure, as far as bees are concerned, as I do not see many bees at work on it. Yet there must be a considerable amount of honey there and easy to get at, as I notice flies and all kinds of insects at work on its flowers. There are a few bees occasionally on it, but they seem to flit very rapidly from flower to flower, never stopping for more than a second on each.

Mignonette seems to be one of the best honey plants in a garden. You can always depend on finding a bed of this sweet-scented annual covered with bees.

Now that the summer has arrived, each hive should be on a stand with legs, and each leg should be inserted into a small tin can, filled with paraffin and water, to keep ants out of the hive. Ants are greatly to be feared, especially if a colony is weak. About a month ago, a small swarm

of mine suddenly left their hive, although it contained brood in all stages. On examination I found a nest of ants under the hive, and the ants were filling up the legs in hundreds. I adopted the old plan of putting the legs in paraffin and water, and I have had neither ants nor any other trouble in the hive since. A very strong colony will keep the ants out, but, in the case of a weak swarm, the ants take complete possession. Frogs and toads are also great enemies of the honey bee, especially when the hive is right on the ground, without a stand. The frogs will just sit on the alighting board, and immediately a bee pops out to see what is thumping about on his verandah, he is captured and eaten at once. This usually happens at night. There is little to fear from these gentlemen provided the hive is on a stand, although they are occasionally known to leap up on to the alighting board in search of their prey, but this rarely happens.—Yours, etc.,

OBSERVER.

Pietermaritzburg.

[See "Notes and Comments."]

Crop Reports for October.

THE month of October was characterised, as regards meteorological conditions, by a sufficiency of rain in practically all the districts of the Colony from which we have received reports. Four reports only speak of "insufficient" rainfall; whilst on the other hand our Nqutu correspondent states that the rain in his district has been excessive. Hailstorms have commenced, and reports from Glencoe Junction, Wyford, Ladysmith, Newcastle, Olivier's Hoek, Nkandhla, Utrecht, Vryheid, Glenisla, Krantzkop, and Greytown, report damage done—in most cases slight. In Nqutu district considerable damage was done by high winds.

Reports regarding the mealie crop are commencing to come in. Our correspondents at Olivier's Hoek, Newcastle, Krantzkop, Maputa, Muden, Glencoe Junction, Ingogo, Nkandhla, New Guelderland, and Darnall, state that the prospects of the crop in their respective districts are very promising. As far as can be seen, the potato and forage crops are doing well; and such reports as we have received of the wattle bark crop indicate favourable prospects. Notwithstanding damage, doubtless done by hailstorms, the prospects of the fruit crop are reported good, and apparently good results will be obtained. Camphor, cinnamon and pimento are

doing very well on the coast; and chicory is being tried at Muden for the first time this season. Our Tongaat correspondent, writing on the 1st November, reported that cane planting in his district was then about completed, and the earlier planted canes were coming up very well.

Prices of live stock are reported good in the Nel's Rust, Richmond, Elands Kop, Creighton, Himeville, Riet Vlei, Ladysmith, Glenisla, Seven Oaks, Newcastle, and Pinetown districts. The prices of eggs and poultry have been low in most districts from which reports have been received. Milk and butter have, on the other hand, been, generally speaking, high.

Locusts are being reported upon by most of our correspondents; particulars of their movements (compiled from his own reports) are given by the Entomologist, in his monthly "Notes," in another portion of this issue.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the principal South African markets during the month of October-November, have averaged as follows:—

NATAL.

PIETERMARITZBURG.

The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Fowls, 2s; ducks, 2s 6d; turkeys: cocks 12s, hens 5s 6d; guinea-fowls, 3s; rabbits, 1s 6d.

Animal Produce.—Bacon, 7d per lb; ham, 9d per lb; lard, 8d per lb; pork, 5d per lb; eggs, 10d per dozen; butter, 10d per lb; cheese, 9d per lb; hides, 7d per lb; honey, 7d per lb.

Vegetable Produce.—Beans, 12s per 100 lbs; buckwheat, 10s per 100 lbs; earth nuts, 10s per muid; barley (green), £2 per ton; oats (green), £1 10s per ton; lucerne: green £3 10s, dry £4 per ton; hay, £1 per ton; amabela, 12s per muid; mealies, 9s 6d per muid; Japanese millet, 4s per 100 lbs; onions, 12s per 100 lbs; peas, 8s 6d per 100 lbs; potatoes, 5s per 100 lb; sunflower seeds, 7s per 100 lbs; sweet potatoes, 2s 6d per muid; tobacco, 6d per lb; bananas, 1s 3d per 100; oranges, 4s per 100; naartjes, 4s per 100; plums, 4d per lb.

DURBAN.

The Market Master reports the following average prices realised during the month ended 15th November:—

Live Stock and Animal Produce.—Sucking pigs, 5s 6d; fowls, 1s 10d; ducks, 2s 7d; guinea-fowls, 3s 3d rabbits, 1s 3d; eggs, 1s 1d per dozen; butter, 1s 2d per lb; pork, 3½d per lb.

Vegetable Produce.—Amadumbe, 3s per muid; earth nuts, 12s 6d per muid; Kafir corn, 10s per muid; mealies, 10s per muid; potatoes, 9s per muid; sweet potatoes, 4s 6d per muid; turnips, £3 per ton.

TRANSVAAL.

JOHANNESBURG.

Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg representing the farmers' co-operative associations of the Cape Colony, has furnished the following prices realised on the Johannesburg market during the week ended 14th November.

Market Prices.

Live Stock.—Oxen: slaughter £8 to £16 each, dressed £1 17s 6d to £2 2s per 100 lbs; cows (milk), £16 to £33; sheep: slaughter hamels 16s to 24s each, dressed 5d to 5½d per lb; pigs, 3d to 3½d per lb, live weight; donkeys, £6 to £8 10s each; mules, £14 to £20; fowls, 2s to 3s; ducks, 3s to 3s 6d each; geese, 5s to 6s; turkeys: cocks 10s to 16s, hens 5s to 7s.

Animal Produce.—Butter, 1s to 1s 6d per lb; eggs: new laid 1s 9d to 2s, fresh 1s 3d to 1s 6d per dozen.

Vegetable Produce.—Bran, 6s 9d to 7s per bag of 100 lbs net; barley, 7s to 7s 6d per bag of 160 lbs net; beans (dry), £1 to £1 17s 6d per bag of 200 lbs net; chaff, 2s 6d to 4s 6d per 100 lbs; forage, 4s 6d to 6s 3d per 100 lbs; Kafir corn, 11s to 12s 6d per bag of 200 lbs net; lucerne (dry), 4s to 6s 3d per 100 lbs; mealies, 8s 9d to 9s 6d per bag of 200 lbs net; onions, 16s 6d to £1 10s per bag of 120 lbs net; oats (seed), 6s 6d to 10s per bag of 130 lbs net; potatoes, 10s to 17s 6d, medium 5s to 9s 6d per bag of 150 lbs net; sweet potatoes, 7s per bag of 120 lbs; turnips, 1s 6d to 3s per bag; bananas, 2s to 4s per 100; grenadillas, 2s 6d to 3s 6d per 100; lemons, 2s to 8s per 100; naartjes, 3s 6d to 6s per 100; oranges, 2s to 6s 6d per 100.

Notes.

Mr. Webb also contributes the following notes on the Johannesburg produce market:—

Live Stock.—I have little to add in regard to this section since my last notes. Prices for both beef and pigs are somewhat easier, and supplies are coming forward freely. Best class mutton is also a trifle lower, whilst second-grade is sold down to 4½d. Farmers continue to forward

mixed qualities, which is a great mistake. Nothing spoils the sale of good animals so much as being trucked with inferior stuff. The same care should be taken in trucking sheep as in trucking grain, forage or lucerne. Careful grading and selection will always pay well, and this cannot be too often dinned into the ears of our farmers. The present haphazard way of doing business must be altered if the best financial results are wanted.

Poultry.—A large business continues to be done in this department, and prices will advance as Christmas approaches.

Butter.—This article is arriving in increasing quantities, some consignments being of excellent quality. Considerable business can be done outside of the morning market.

Eggs are still coming to hand in sufficient lots, and prices remain fairly firm at current rates.

Mealies have shewn an advance of nearly ten per cent. during the month, but prices are expected to ease off towards the end of the year. The oversea market found by Natal farmers has caused a shortage in local supplies, which is reflected in the better prices obtainable.

Kafir Corn is firmer than known for many months, good quality both Red and White causing animated bidding. Much more can be consigned to this market than is at present coming forward.

Potatoes.—New season's have ousted the old stock almost entirely, and prices for best qualities are fairly remunerative. Consignments of the early varieties should be forwarded as quickly as possible. The recognised market weight per bag is now 150 lbs.

Onions.—Best dry Yellows are realising excellent prices, and consignments should be sent forward regularly.

Beans.—Best qualities Sugar and Rangoon are firm at highest rates, whilst a good enquiry exists for Canadian Wonders. Kafir varieties are easier.

Forage.—The market has been rather poorly supplied in this article during the month, and prices have accordingly remained above expectation. Very little last season's forage now comes to hand, supplies being mostly new season's grown in this Colony. Farmers should be careful to see that the forage is properly dried before being packed and pressed.

Lucerne Hay.—Almost the same remarks apply to this article as to forage. Owing to the prolonged drought in the Cape Midlands very little Colonial is coming forward. The locally grown article is, however, of splendid quality, and, being well-cut, pressed and wired, reflects the greatest credit upon the producers.

Fruit.—Cape strawberries, cherries and apricots have come in, and the fruit season may be said to have commenced. Very fair prices generally obtain in this section, especially for early consignments of new varieties.

CAPE COLONY.

The following information has been compiled from the last available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 16th November), appearing in the *Cape Times*:—

The produce market showed a tendency during the week under review again to weaken slightly, but this may be attributed to merchants having fulfilled country and oversea business; while buyers are being influenced to postpone further purchases as far as possible in view of the near approach of new season's produce. Oat hay has again weakened, and new season's crops are expected to reach a very low figure.

Live Stock and Animal Produce.—Fowls: small 1s 2d to 1s 4d, medium 1s 6d to 1s 10d, large 2s 3d to 2s 10d; ducks, 3s to 3s 9d; turkeys: cocks 5s to 9s each, hens 4s 6d to 6s 6d; geese, 3s 6d to 4s 9d; ostrich eggs, 1s each (in demand); eggs: fresh 9s to 10s per 100, not guaranteed 8s to 9s 6d per 100 (supplies not equal to demand, and prices are firm as quoted); butter, best, 1s 4d wholesale, 1s 9d retail; Colonial Cheddar cheese, 9d to 10½d per lb, delivered Capetown; Colonial Camembert cheese, 9s per dozen; Colonial National cream cheese, 4s 6d per dozen.

Vegetable Produce.—Merchants were offering 6s 7½d per 150 lb, delivered Capetown Docks, for oats for export, the price having receded in consequence of the London market prices weakening. The attention of farmers still holding stocks of oats is invited to the fact that the local demand is comparatively very little, and that the new crops are expected to be large. Owing to a drop in the Australian wheat prices, the local market is slightly easier, and buyers are now offering 20s to 21s for January and February deliveries, or 22s for immediate delivery, *ex* country stations.

The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 lb: New season's, Caledon, 1st, 20s to 21s; Malmesbury, 20s 6d to 22s; Moorreesburg, 20s to 20s 6d; Porterville-road, 21s to 22s 6d.

Colonial oats, per 150 lb: Caledon, 1sts, 6s to 6s 3d; 2nds, 5s 6d to 5s 9d; Moorreesburg, 7s to 7s 1½d; main line, 7s 3d to 7s 4d; Malmesbury, 7s to 7s 3d.

Colonial barley, per 150 lb; Moorreesburg, 7s 9d to 8s; main line, 8s to 8s 6d; Caledon, 7s 6d to 7s 9d.

Colonial rye, per 200 lb: Country stations, 18s to 18s 6d, *ex* stores, Capetown, 18s 9d to 19s.

Kafir corn, per 200 lb: Red, 13s 9d to 14s; white, 12s 6d to 12s 9d, *ex* stores, Capetown.

Bran, per 100 lb, 5s 3d to 5s 4½d, *ex* stores, Capetown.

Mealies, per 200 lb, *ex stores*, Capetown: Natal yellows, 13s 6d to 13s 9d; O.R.C., small yellows, 13s 9d to 14s; Natal white coast, 13s to 13s 6d; Eastern Province Germans, none offering; Eastern Province mixed, 13s to 13s 6d.

Forage, per 100 lb: Colonial lucerne hay, 4s 6d to 4s 9d, *ex stores*, Capetown. Colonial oat-hay, 3s 2d to 3s 3d, main line stations; 3s to 3s 1½d, Moorreesburg and Malmesbury. Colonial fodder, 4s 6d to 4s 9d, *ex stores*, Capetown. Colonial compressed chaff, 1s 8d to 1s 9d, main line stations; 1s 3d to 1s 7d, Moorreesburg and Malmesbury.

Vegetables and Fruit.—Beans: green 7s 6d to 12s per bag, Natal and sugar: 40s per bag (in demand); potatoes: new season's 7s 6d to 10s 6d per bag, second quality 3s 6d to 5s 6d per bag; sweet potatoes, 6s to 7s 6d per bag (in demand); onions (new season's), 11s to 12s 6d per bag; green peas (fresh) 6s to 8s 6d per bag; tomatoes, 4d to 6d per lb; apricots, 1s to 5s per 100; plums, 1s to 4s per 100, small; Cape lemons, 6d to 1s 3d per box of about 100-150; limes, 2s 6d to 6s per 100 (in demand); bananas, 17s to 18s per case, choicest, 20s to 24s per case; pineapples (E.P.), 3s per dozen; oranges, market has been over-supplied during the past week, consequently prices are lower than last week, excepting for extra large, which sold from 6s to 10s per 100, medium 3s to 5s 6d per 100, small 1s 9d to 2s 6d per 100; naartjes: large 6s to 9s per 100, medium 2s 6d to 4s per 100; apples, Cape, 6s to 7s per 100 to 150, imported 35s to 41s per cask.

KIMBERLEY.

Messrs. James Lawrence & Co., Ltd., P.O. Box 301, Kimberley, supply the following report dated the 15th November:—

The market is firm and meals and flour have maintained last week's advances. Mealies and kafir corn have also firmed. Forage and oats very plentiful and cheap. Bran has not advanced in sympathy with meal. Chaff plentiful. Lucerne hay in demand. Onions are weaker owing to new season's arriving. No demand for old season's potatoes, but ripe large new season's are firm. Butter weaker. Eggs have advanced slightly. Large demand for fat poultry. Oranges and naartjes, cabbages and cauliflowers in demand. Fair assortment of other fresh vegetables. Little doing in live stock. No demand for pigs.

Live Stock.—Oxen (good) prime, 600 lbs upwards, £10 to £15; cows (good) 450 lbs upwards, £5 10s to £8; calves, 5½d per lb dead weight; pigs, 100 lbs (clean), 3d to 3½d per lb live weight; lambs, 30 lbs, 11s to 13s; hamels, 40 lbs to 45 lbs, 14s to 17s; trek oxen, £7 to £8; riding horses, £10 10s to £27 10s; draught horses, £10 to £25; mares, £10 to £25; fowls, 1s 6d to 2s 6d; ducks, 3s to 3s 9d; turkeys, 7s to 15s.

Animal Produce.—Butter: fresh 1s to 1s 4d, second quality 9d to 11d per lb; eggs, 1s 2d to 1s 5d per dozen; hams and bacon, 5d to 8d per lb.

Vegetable Produce.—Bran, 6s to 7s per bag of 100 lbs; barley, 7s 6d

to 12s per bag of 163 lbs; beans: sugar 30s to 40s, Kafir 13s to 17s 6d per bag of 203 lbs; chaff: Colonial 6s 6d to 12s 6d per bale, Colonial pressed 3s 3d to 4s per 100 lbs; forage: good 5s to 6s, inferior 3s 6d to 4s 6d per 100 lbs; Kafir corn: South African mixed 9s 6d to 11s, white 12s 6d to 16s; Boer meal, Colonial: unsifted 29s to 31s 6d, sifted 30s to 36s; flour, Colonial, 17s to 18s per bag of 100 lbs; mealies: yellow Colonial 9s to 10s 6d, white Colonial (hard) 9s to 10s, mixed 8s 9d to 9s 9d, per 203 lbs; mealie meal: O.R.C. 11s to 12s, white 11s to 12s per 183 lbs; Cape oats, 9s to 10s 6d per bag of 150 lbs; lucerne hay, 3s 6d to 5s per 100 lbs; onions, 22s 6d to 27s 6d per bag of 120 lbs; potatoes, 3s to 6s, new 9s to 16s, local district 7s to 10s; tobacco: good 4d to 7d per lb, inferior 2d per lb; wheat, 20s to 24s per bag of 203 lbs; oranges, 5s to 9s per 100; lemons, 2s to 4s per 100; naartjes, 4s to 6s per 100; pineapples, 3s to 4s per dozen.

ORANGE RIVER COLONY.

BLOEMFONTEIN.

The Bloemfontein *Weekly Post* publishes the following prices realised on the Bloemfontein market on Saturday, 16th November:—

Live Stock and Animal Produce.—Fowls, 2s 3d to 2s 9d; dressed fowls, 2s 6d to 3s; geese, 5s to 6s; ducks, 2s 9d to 3s; eggs, 1s to 1s 3d per dozen; butter, 1s 3d to 1s 9d per lb.

Vegetable Produce.—Mealies, 7s 6d to 10s 3d per bag; Kafir corn, 14s to 15s per bag; oat hay, 5s to 6s 3d per 100 lbs; chaff, 4s 6d to 5s 9d per 100 lbs; Kafir corn chaff, 2s 6d to 4s per bale; barley, 8s to 10s per bag; bran, 7s 6d per bag; oats, 10s to 11s per bag; potatoes, 7s 6d to 12s per bag; oranges, 5s to 8s per 100; pineapples, 1s 6d to 2s 6d per dozen; apples, 5s to 8s per 100.

WOOL, MOHAIR, ETC.

Messrs. W. Dunn & Co., Durban, in the course of their report on wool, mohair, etc., give the following prices:—

WOOL.

On the market this week there were 3,000 bales offered, of which about 1,500 bales were declared not sold, as prices offered were $\frac{1}{2}$ d. to $\frac{3}{4}$ d. under valuation. The drop in the market is due no doubt to the financial trouble in America, but we hope for an improvement shortly.

Transvaal and West O.R.C.

Good long light, 12 months, 7d to 8d; average ditto, $6\frac{1}{2}$ d to $7\frac{1}{2}$ d; heavy inferior ditto, $5\frac{1}{2}$ d to $6\frac{1}{2}$ d; superior short clean, $6\frac{1}{2}$ d to $7\frac{1}{2}$ d; earthy heavy ditto, 5d to $5\frac{1}{2}$ d.

Harrismith and Vrede District.

Good light, 12 months, 7½d to 8¼d; average ditto, 6½d to 7d; short clean, 6-9 months, 6½d to 7d; heavy inferior, 12 months, 6d to 6½d; earthy heavy, 5½d to 5¾d; average fair ditto, 6d to 6¼d.

NATIVE WOOLS.

Basutoland, 6½d to 7¼d; East Griqualand, 7½d to 8½.

MOHAIR.

The market for this staple has been stagnant. Out of 150 bales offered, about ten were declared sold. We do not expect an improvement for some time. Stocks in town are about 700 bales, principally mixed.

We quote:—Superior long sorted O.R.C. and Transvaal, 13d to 13½d; fair average, 11½d to 12d; mixed, 10½d to 11d; coloured and kempy, 7d to 8½d.

HIDES AND SKINS.

Hides.—Superior sun dried, 6¾d to 7d; damaged, 5½d to 6d; salted, 6d to 6¼d.

Sheep Skins.—Sound skins are quoted at 6d to 6¾d; damaged, 4d; average, 5½d to 6d; mixed parcels, 4½d to 5½d.

Goat Skins.—Sound skins, 5d to 6d; average, 4d to 5d.

Angora Skins.—Sound, 5d to 6d; damaged, 2½d.

The Oversea Maize Market.

THE POSITION IN OCTOBER.

THE following information regarding the oversea maize market in October has been compiled from *Beerbohm's Evening Corn Trade List*:—

WEEK ENDED OCTOBER 4TH.

During this week maize values further rather improved, partly in sympathy with the firmness in wheat and partly owing to the smaller shipments, but there was no activity in the demand.

Advices concerning the Roumanian crop continued very unfavourable. The official indication during the week under review was for a crop not much exceeding five million quarters, against 14,700,000 quarters last year; in other words, this season's production looks like being less than the ordinary annual consumption, so that stocks of old corn carried forward may be required to supply the deficit. From America the crop reports were rather more favourable; but there appeared no doubt

that both the maize and oats crops in America this year will show large deficiencies compared with last year. One correspondent of the *Corn Trade List*, in fact, remarks that for the first time for a good many years the maize crop is a partial failure in both America and Europe, and as the price of wheat is evidently going to rule at 40s. to 45s., the value of maize ought to reach 30s. to be in proper proportion.

The speculative demand for maize improved decidedly during the

WEEK ENDED OCTOBER 11TH,

and prices had advanced about 1s. per quarter. The continued very unfavourable reports regarding the Roumanian crop, and the difficulty of buying old corn there, added to the official indication that the American crop is 475 million bushels less than last year, have, it is stated, combined to bring home to buyers that maize, like wheat, and partly in sympathy with that article, is likely to be very dear before many months are past.

Argentina continued to "exceed all expectations" in the matter of maize exports. It was considered not at all improbable, however, that these shipments will come to an end much earlier than is usual, as there is no doubt that the high prices obtainable have attracted a large proportion of the surplus this season at an earlier date than usual.

WEEK ENDED OCTOBER 18TH.

With relatively small shipments to Europe the previous week and continued very unfavourable crop reports from South-Eastern Europe, prices of maize were further decidedly advanced this week, but the demand was evidently checked thereby. Up to 29s. per 480 lbs. was paid for Dan-Gal-Fox steamer afloat, and 28s. 9d. for 20 Oct.-Nov. shipments of La Plata. Argentina again made a relatively good shipment during the week; but for distant shipments there were very few sellers, and there was considered to be little doubt that the surplus was rapidly coming to an end.

During the

WEEK ENDED OCTOBER 25TH

there was a very poor demand for maize, and prices gradually gave way—not because of any pressure to sell, but rather owing to sheer absence of demand. There were no sales of cargoes. In Mark Lane spot values declined about sixpence per quarter on the week, with a poor demand, although supplies were by no means large.

Crop reports from Roumania remained very unfavourable. The preliminary official estimate of the crop was 7,250,000 quarters, against 16,000,000 quarters last season; but the *Corn Trade List's* Ibrail correspondent, writing on the 21st October, did not believe that even this total would be reached, his opinion being that there would be very little exportable surplus. The home requirements of Roumania were, indeed,

iced at about 6,000,000 quarters. The *List's* correspondent added that a new corn was arriving in very poor condition, and that consequently would be dangerous to ship even with a good admixture of old maize.

STATISTICS.

With very little maize forthcoming from Roumania, and very little from America until next January, the Argentine supplies in the next few months will naturally become a very important factor. Usually by the end of October 70 to 80 per cent. of the total surplus has been exported from that country; this season, owing to the very attractive prices, the proportion is doubtless over 80 per cent. The actual shipments in the past five years from May 1st to October 31st compare as follows, with the total for the season:—

ARGENTINE MAIZE EXPORT.

				May 1 to Oct 31.	Total for Season.
				Qrs.	Qrs.
					(Estimated.)
1907/08	...	...	...	4,575,000	5,500,000
1906/07	...	...	...	8,750,000	12,000,000
1905/06	...	...	...	7,900,000	10,150,000
1904/05	...	...	...	7,765,000	11,390,000
1903/04	...	...	...	7,510,000	10,220,000
1902/03	...	...	...	4,500,000	5,220,000

The general statistical position of maize on the 25th October was as follows:—

				1907—qrs.	1906—qrs.	1905—qrs.
Shipment to U.K.	...	...	...	955,000	770,000	510,000
" Cont.	...	...	...	530,000	1,020,000	690,000
Shipment into U.K. for the 42 weeks ending Oct. 19	...	...	...	10,039,000	9,060,530	9,052,600
Supply in U.S. (<i>Bradstreet's</i>)	...	...	...	1,135,000	856,900	718,000
Harvest in crop	...	...	...	340,000,000	316,000,000	285,000,000
Price, Spot	...	...	...	71c	55c	62c
Price, La Plata landed	...	...	...	27/9	20/9	24/9

SHIPMENTS OF MAIZE TO EUROPE FROM JANUARY 1ST TO DATE.

	1907.	1907.	1906.	1906.	1905.	1905.
	U.K.*	Cont.	U.K.*	Cont.	U.K.*	Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
...	3,380,000	3,926,000	3,634,000	5,741,000	4,225,000	5,310,000
...	3,186,000	1,763,000	4,882,000	4,120,000	5,463,000	3,108,000
...	1,399,000	1,983,000	170,000	286,000	220,000	512,000
...	2,225,000	3,678,000	444,000	1,168,000	132,000	140,000
Total	10,190,000	11,350,000	9,130,000	11,315,000	10,040,000	9,070,000

* Includes shipments for orders.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of October, 1907:—

Name of Colliery.	Average Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			Tons. Cwt
	E.	N.	I.	E.	N.	I.	E.	N.	I.	
Natal Navigation ..	34	83	269	22	331	240	4	12	4	26,348 6
Elandslaagte ..	20	22	296	19	205	478	2	1	3	17,500 2
Durban Navigation ..	26	182	52	10	366	67	—	—	—	15,010 0
Glencoe, Natal ..	13	115	85	11	498	17	—	—	—	14,534 9
Dundee Coal Co. ..	20	11	227	14	58	348	1	1	21	14,020 0
South African ..	11	10	135	12	230	26	5	27	24	13,647 9
St. George's ..	17	103	103	12	214	151	3	10	—	13,045 0
Natal Cambrian ..	15	44	175	9	301	89	6	8	2	12,002 2
Newcastle ..	10	41	25	8	288	2	11	3	—	7,324 11
Ramsay ..	4	12	52	4	76	105	2	5	10	3,251 5
Natal Steam Coal Co. ..	4	46	5	2	175	5	—	5	1	3,102 11
West Lennoxton ..	5	3	63	2	28	105	—	—	—	2,760 5
Central ..	5	62	7	7	205	12	2	6	—	2,498 13
Talana (Natal) ..	6	13	26	3	42	80	1	2	1	2,154 14
Zululand† ..	6	59	—	4	55	—	4	4	—	1,276 6
Ballengeich ..	1	10	2	1	10	—	13	80	11	34 4
Nooitgedacht ..	1	1	—	1	3	—	—	—	—	4 0
Dumbi Mountain ..	1	1	—	—	—	—	—	—	—	3 0
Totals	199	818	1,522	141	3,085	1,725	54	164	77	148,516 17
Corresponding month, '06	150	727	1,259	122	2,702	1,529	58	220	276	116,964 13

* Cost charged to Capital Account.

† Includes September Return.

Maritzburg,
7th November, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of October, 1907:—

	Tons.	Cwt
Bunker Coal* ...	71,206	4
Exported to:—		
East London ...	2,368	7
Algoa Bay ...	8,873	1
Cape Town ...	20,615	11
Buenos Ayres ...	3,307	2
Bombay ...	2,963	7
Mauritius ...	104	15
Penang ...	1	0
Singapore ...	1	0
London ...	0	12
Total ...	109,440	19

* Including 2,518 tons 1 cwt. taken by H.M. Warships and Transports.

Custom House, Port Natal,
1st November, 1907.

W. L. HOWE,
for Collector of Customs.

Manures on the Natal Market, Season 1907.

NAME OF MANURE.	PHOSPHORIC ACID.										Estimated Total Value of Manure per Ton (2,000 lbs.) f.o.r. Durban.	Price asked per Ton of 2,000 lbs. f.o.r. Durban.				
	NITROGEN.		Water Soluble.				Citrate Soluble.		Citrate Insoluble.				TOTAL.		POASH.	
			Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.			Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.			£ s. d.	£ s. d.	£ s. d.	£ s. d.
<i>Nitrogenous:</i>																
Sulphate of Am- monia ...	20.73	16 1 4	...	...	...	...	...	...	...	...	...	...	...	16 1 4	16 12 6a	£ s. d.
Nitrate of Soda	16.06	12 14 3	...	...	...	...	...	...	...	...	...	...	...	12 14 3	12 15 0a	£ s. d.
do.	16.02	12 13 8	...	...	...	...	...	...	...	...	...	...	...	12 13 8	12 10 0b	£ s. d.
do.	15.51	12 5 7	...	...	...	...	...	...	...	...	...	...	...	12 5 7	12 4 6c	£ s. d.
Nitrate of Pot- ash ...	13.58	10 15 0	...	...	...	...	...	...	...	...	...	...	44.47	22 19 7	21 0 0b	£ s. d.
"Nitrate of Lime"	17.35	13 8 11	...	...	...	...	...	...	...	...	...	...	...	13 8 11	...	£ s. d.
<i>Mainly Phosphatic:</i>																
Superphosphate (Double)	...	...	39.76	11 2 0	2.82	0 11 9	0.34	0 0 11	42.92	11 14 8	...	...	...	11 14 8	12 0 6d	£ s. d.
Superphosphate (High Grade)	...	...	17.50	4 17 9	1.52	0 6 4	0.22	0 0 7	19.24	5 4 8	...	...	...	5 4 8	5 4 6e	£ s. d.

Superphosphate (High Grade)	...	...	17'35	4 16 10	1'01	0 4 3	0'10	0 0 3	18'46	5 1 4	...	...	5 1 4	5 5	5 ob
Superphosphate	...	...	16'01	4 8 7	1'23	0 5 2	0'51	0 1 5	17'75	4 15 2	...	...	4 15 2	4 17	6f
do.	...	...	13'74	3 16 9	2'05	0 8 7	0'96	0 2 8	16'75	4 8 0	...	...	4 8 0	...	g
Bone Flour (Steamed)	1'37	0 15 9	...	...	9'05	1 17 9	23'83	3 5 6	32'88	5 3 3	...	...	5 19 0	6 0	ob
Bone Ground ...	4'05	2 6 7	...	...	4'15	0 17 4	20'41	2 16 1	24'56	3 13 5	...	...	6 0 0	6 0	ob
do. do. ...	3'99	2 5 11	...	...	5'64	1 3 6	17'97	2 9 5	23'61	3 12 11	...	...	5 18 10	6 4	2h
Basic Slag ...	...	...	...	...	8'65	2 3 3	9'31	1 14 11	17'96	3 18 2	...	...	3 18 2	3 19	6c
<i>Potassic :</i>															
Muriate of Pot- ash ...	...	...	...	...	...	...	...	...	...	...	...	60'32	14 1 6	13 10	ob
Muriate of Pot- ash ...	...	...	...	...	...	...	...	...	...	...	...	57'80	13 9 9	13 15	oa
Sulphate of Pot- ash ...	...	...	...	...	...	...	...	...	...	...	...	50'72	13 19 0	13 15	oa
Sulphate of Pot- ash ...	...	...	...	...	...	...	...	...	...	...	...	50'61	13 18 4	13 10	ob
Nitrate of Pot- ash ...	13'58	10 15 0	...	...	...	...	...	...	...	...	...	44'47	12 4 7	22 19 7	21 0 ob
Kainit ...	...	...	...	...	...	...	...	...	...	...	...	12'65	2 19 0	2 19 0	2 17 6c
<i>Complete :</i>															
Potato ...	2'68	2 1 2	7'52	2 2 0	3'35	0 14 0	2'48	0 6 10	13'35	3 2 10	3'71	0 17 4	6 1 4	7 12	oe

NAMES OF SELLERS.—a—Henwood, Son, Soutter & Co. b—South African Fertilizers Co. c—Steel, Murray & Co. d—F. & G. Reiche.
e—J. Raw & Co. f—W. Dunn & Co. g—Natal Chemical Syndicate, Ltd. h—H. C. Foss & Co., Ladysmith.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	W. Anderson	Netherby
			Jinze	Rosshoorn
			Mapelwana	Roodepoort
			W. M. Buys	Ruit Kuil
			F. Colling	Klipdal
			F. T. Hyde	Himsley
			H. N. Nel	Catharine
			Ingetenga	Roodepoort
			J. van de Bosch	Rutherglen
			C. F. Marals	Ontekena
			H. Dicks	The Cave
			Mrs. W. Gibson	Breezie Braes
			Striner Ka Yabya	Tiliz Hill
			Kinisenika	
J. R. Cooper	Nkandhla & Ngutu		Makwangqa	Selutshana
			Legudhla Mni	Ngutu Hill
			Gada'eni Chief	Sandheawana
			Makuba Uilife	Haladu
			Menezi Kamadagatu	Kwondekca
			Boy Ka Matato	Ngutu Loot
			Peli	Ngutu
			Lerazake Leputza	Matethling
			Abela Kuzeizili	
			Nsinango Butelezi	Selutshana
			Sekwata Ngobeze	Ngutu
			Lepondo and others	Ilazagaza
			Madiwo and others	
			Guzi Ka Mfeka	
			Lekemga	
			Mpitipiti	Sandheawana
			Dakasele	Selutyema
			Somtomo Ngobeze	Malagato
			Dabeni Mqube	Moweni
			Jabez Mbita	Ngutu Town
			Albert Selepe	Magubeni
			Leyarha Sondetzi	Nkandi
			Letuza Mlefe	Ncenceni
			Letuza Mlefe	Haladu
			Lunwiza Sondelzi	Nkandi
			Kanyiza Ntombelha	Magogo
			Mishaki Butelzi	Ngutu
			Mbanko Dubenzana	Telezi Hill
			Mhlawafa Mhlobo	Mkanjalo
			Lefablaselepe	Ngutu
S. A. Brown	Underberg		J. A. Stone	
			T. de C. Arbuckle	Kerridge
			B. Phipson	Strathcampbell
			M. Fraser	Winterhoek
			R. C. Gold	Woodend
			J. R. Royston	Greenend
			J. van Whye	Silburn
			F. A. Hathorn	Sauguana
			T. Palfraiman	Slogoma
			J. J. B. Cooke	Estcourt
A. B. Koe	Portion of Estcourt		F. R. Moor	Greystones
A. J. Marshall	Dundee		R. J. du Bois	Giba
			J. W. de Bruns	Rooifontein
			C.M. & T.C. Vermaak	Paddock & Harriotdale
			C. J. Pieters	Zwaartwater
E. Varty J. J. Hodson	Western Umvoti Ptn of Lion's River		P. J. Meyer	Kilburn
			A. Date	Kemperweldt
			C. P. Cronje	Kilburn
			C. A. Charlwood	Craigieburn
			W. A. Dales	Gowrie
			G. Woodhouse	Halliwe
			G. H. Burgmann	Boschhoek

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—continued.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
R. Mayne ..	Krantskop ..	Lungsickness	Maqamganse ..	Loots Hoek
		"	Uqupu ..	Myoniezwe's Locat'n
		"	Ndabane ..	"
		"	S. Johnson & Co. ..	Inadie Store
		"	Ndabane ..	Myoniezwe's Locat'n
		"	Natives ..	Myoniezwe's Locat'n
		"	Amosi ..	"
A. H. Ball ..	Weenen ..	Scab	Vunyo and others. ..	Elena Berg
		"	L. J. & T. C. Lotter	Waterfall
		"	S. C. Van Rooyen. ..	Middleburg
		"	A. & M. Lotter ..	Waterfall
		"	C. P. F. Lotter ..	"
		"	D. Huyser ..	Bird Spruit
		"	J. L. Fourie ..	Scottshoek
G. Daniell ..	Vryheid ..	"	Nkanyeze. ..	Mooiplaats
		"	Moolie ..	Beaufort
		"	Zimbata ..	Nooitgedacht
R. Mayne ..	Eastern Umvoti ..	Lungsickness	Nkabi and others	Loots Hoek
		Scab	P. Mare ..	Speculation
J. Button ..	Portion of Estcourt	"	J. Phipps ..	Littlecote
E. Parkinson ..	New Hanover ..	"	Ndabeni and Jim ..	Location
		"	W. J. Dickens ..	Laager Farm
D. M. Pfaff ..	Utrecht ..	"	B. J. J. Human ..	Wetvedden
J. Stewart ..	Bergville ..	"	J. Bester ..	Abergeldie
		"	J. Lawford ..	Mt. Hilda
		"	G. L. Coventry ..	Barby
		Lungsickness	G. W. Horton ..	Hortonradford
		"	Macomi ..	Woodford
		"	Lunaba ..	Hortonradford
R. Wingfield Stratford	Newcastle ..	Scab	J. H. Muller ..	Leyden
		"	C. Friend ..	Lilydale
		"	J. van Niekerk ..	Pomeroy
		"	J. de Wet ..	Schuitshoogte
		Lungsickness	Umlozi ..	Vrede
J. G. Speirs ..	Impendhle ..	Scab	Finda, Vete & Sobuon	Frith
A. Brown ..	Polela ..	"	Mahlali ..	Stoffietown
		"	F. J. Livingstone ..	Fernbank
		"	H. Cole ..	Cameron
		"	P. J. Venter ..	Everfair & Spring-holmes
L. Trenor ..	Harding ..	Lungsickness	Madanokana ..	Tridale
		"	Yanyan ..	Moliswa
		Scab	F. C. Young ..	Winterhoek
C. T. Vaughan ..	Paulpietersburg ..	"	J. D. Van Colles ..	Schurweberghoek
B. Klusener ..	Port Shepstone ..	Lungsickness	G. Daddy ..	Sugar Bush Cutting
		"	Mbontshe. ..	Isotsha

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
Nseleni ..	Markwa Mountain.	Genegwa ..	Polela, Location No. 2
Abbott Bros. ..	Mooi River		

Mr. Luther Burbank recently packed a box of seventy-three varieties of apples, all picked from one tree. He uses the various varieties in cross-breeding experiments.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of October, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from July 1st, 1907.	Total for same period from July 1st, 1906.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	74.2	59.7	83.5	52.8	4.56	13	.87	5th	7.62	11.72
Stanger ..	77.4	58.2	102	53	3.36	18	1.02	29th	7.40	11.38
Vernham ..	83.3	60.3	101	52	3.51	14	1.52	24th	7.10	11.00
Greytown ..	74.5	45.5	95	35	4.44	17	1.21	28th	6.91	6.11
Newcastle ..	73.1	51.1	100	42	5.00	12	.93	28th	7.33	9.51
Ndwedwe ..	70.7	56.4	81	47	4.26	18	1.80	25th	7.77	10.50
Escoourt ..	79.1	48.1	96	40	4.25	11	1.65	2nd	5.55	5.23
Bulwer ..	—	—	—	—	3.69	17	.96	24th	7.44	—
Camperdown ..	74.0	50.5	96	41	3.36	14	.65	25th	5.36	8.12
Mid-Illovo ..	72.5	51.8	95	42	3.44	17	.64	30th	6.87	10.82
Port Shepstone ..	74.4	51.6	82	41	2.76	14	.76	29th	5.47	11.81
Richmond ..	72.8	50.1	99	40	3.66	16	.39	24th	7.16	7.80
Maritzburg ..	75.8	51.9	103	45	3.40	19	.63	22nd	6.03	8.66
Howick ..	74.3	48.9	97	39	2.65	17	.79	24th	5.71	8.46
Dundee ..	77.6	52.1	99	43	3.03	11	1.00	25th	6.91	6.76
Weenen Gaol ..	82.6	51.0	103	42	2.43	15	.40	28th	4.17	5.33
Impenhile ..	74.6	39.8	92	30	2.83	12	1.14	23rd	6.03	5.95
New Hanover ..	78.0	49.6	99	40	5.25	15	2.05	24th	8.77	10.36
Charlestown ..	70.6	44.9	90	35	4.18	15	.95	26th	5.74	7.28
Nongoma ..	75.4	44.5	86	39	4.05	11	1.05	20th	6.37	10.76
N'Kandhla ..	73.6	38.6	89	35	3.15	8	1.10	9th	6.24	9.42
Inqwayuma ..	72.4	54.6	95	46	5.22	13	1.40	25th	6.88	—
Mtunzini ..	77.9	56.1	95	38	6.54	17	2.25	25th	13.33	—
Elabisa ..	77.0	56.9	89	50	6.71	10	1.00	4th	10.96	10.35
Melmoth ..	75.4	53.2	95	44	2.92	16	.61	25th	5.38	10.23
Ubombo ..	70.8	57.5	90	50	4.62	13	1.80	20th	6.64	12.10
Nquta ..	74.5	49.8	95	41	3.63	17	.53	23th	5.51	—
Point ..	—	—	—	—	4.08	14	.88	4th	7.80	13.07
Vryheid ..	76.9	50.5	97	41	4.23	15	1.22	20th	7.61	7.30
Mahlabatini ..	76.6	46.5	92	40	4.98	11	1.80	25th	6.83	7.85
Empangeni ..	77.2	57.2	95	50	4.20	13	1.20	24th	8.24	9.17
Utrecht ..	83.2	55.7	102	28	5.08	11	.88	4th	6.48	—
Amatikulu ..	81.4	58.2	105	47	2.53	15	.45	29th	4.67	8.10

Meteorological Observations taken at Private Stations for Month of October, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Minimum for Month.	Maximum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from 1st July, 1907.	Total for same period from July, 1906.
					Fall.	Day.		
Harden Heights ..	—	—	3.40	12	1.12	25th	5.80	—
Riet Vlei ..	—	—	3.89	12	1.03	2nd	5.94	5.02
Dalton ..	—	—	3.70	15	1.12	24th	6.39	2.87
Nottingham Road ..	—	—	4.42	16	.96	24th	7.78	—
Giant's Castle ..	72.8	46.2	2.95	15	.78	25th	5.15	—
Adamshurst (Wm. Adams) ..	92	44	2.80	12	.61	22nd	4.91	—
Hilton ..	94	42	3.06	16	.70	24th	6.04	9.67
Brankholme ..	—	—	8.03	17	2.50	24th	11.93	11.7
Cedara-Hill ..	91	39	2.50	13	0.50	24th	4.65	8.12
Vlei ..	96	36.5	2.02	14	0.57	24th	4.34	7.89
Winkel Spruit ..	81	50	2.59	9	0.75	20th	7.94	11.91
Weenen ..	96	39	2.15	11	0.33	23th	—	—
Ottawa ..	—	—	3.18	11	1.20	25th	5.98	—
Mt. Edgecombe (Natal Estates) ..	—	—	3.41	14	1.12	25th	7.25	13.50
Cornubia ..	—	—	3.78	—	—	—	7.60	15.0
Milkwood Kraal ..	—	—	3.05	—	—	—	5.96	11.58
Blackburn ..	—	—	3.30	—	—	—	7.06	11.06
Saccharine ..	—	—	3.36	—	—	—	6.76	11.85
Equeefa (W. Hawksworth) ..	90	53	3.54	12	0.68	1 & 30	6.45	18.11
Umzinto, Beneva ..	—	—	2.67	11	0.57	20th	6.43	17.92

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:—

ON THE 4TH DECEMBER.

Mooi River—Brown Kafir goat ram, swallow tail right ear, no brand. Probable value, 10s. Impounded on the 1st November by Mr. J. A. Skottowe.

ON THE 11TH DECEMBER.

Finchley (Ixopo Division)—Bay horse (rigg), black points, right ear swallow tail, old marks of very bad sore on withers, deep dent on near side of neck. Probable value, £7 10s. Impounded on the 6th November, 1907, by Dangundungu, of Lera Vale.

Woodstock (Bergville Division)—Dark bay stallion, about 14 hands, nick out of back of right ear, white star on forehead, white splash above left nostril, right hind foot white, long mane, had headstall and hobbling reim on. Probable value, £10. Impounded on the 2nd November by E. M. Richardson.

ON THE 18TH DECEMBER.

Creighton—(1) Black ewe goat and kid. (2) White ewe goat. (3) White ewe goat, black patch on head.

Finchley (Ixopo Division)—(1) White hog, four white feet. (2) Two brown and black spotted pigs, sows. (3) Black and white spotted pig, boar. (The last three pigs are about two months old or less.) (4) Sheep, ewe, nick in front of right ear. (5) Sheep, ewe, slit in right ear; with ram lamb. (All three branded G on right side.)

Gourton—Black ox, about 5 years old. (Running at a native's kraal on farm "Bergvliet" since 21st October, and reported by Mr. H. Oellermann as too wild to be driven to the Gourton Pound.)

Greytown—Running on Mr. T. J. Nel's (M.L.A.) farm "Craiglands," and reported by him as being too wild to be driven to the Pound: (1) Iron grey mare, 2 years old. (2) Chestnut mare, 2 years old, small star on forehead. (3) Chestnut mare, no marks, 2 years old. No marks or brands on any of the foregoing. (4) Running on Mr. P. R. Botha's farm "Olivefontein," and reported by him as being too wild to be driven to the Pound: Young ox, black and white, no brand, right ear mark swallow tail, and half moon at back of ear, no brand.

Howick—She-goat, black, brown and white, right ear swallow tail, no brands.

Ingogo—Horse, dark bay, blind in left eye, white star on forehead, marked with white hair on back, seems to have had a sore back.

Ladysmith—(1) White Africander sheep, hamel, small horn on the right. (2) Red Africander sheep, ewe, small thin horns, left ear nicked. (3) Dun and white Africander sheep, ewe, right ear slit at back. (4) Two brown and white Africander sheep, ewes, ears marked with pieces taken out of under side.

Mtunzini—(1) Brown mule, mare, branded R near shoulder, circle with radiating lines on near hind quarter. (Impounded by a native on the 26th October.)

Nqutu—(1) Bay gelding, about 13.2, flea-bitten, branded 51 off hind quarter, shod fore feet, short mane. (2) Black cow, Zulu, half moon cut out right ear, cast in left eye. (3) Black heifer calf, fourteen days old. Nos. (2) and (3) reported by Mr. F. Mervyn Peters. Running on farm "Morton," Nqutu Hill, and unable to move owing to East Coast Fever restrictions.

ON THE 2ND JANUARY.

Gourton—(1) Running on the farm "Doveton," and reported by Mr. R. J. Lund as too wild to be driven to the Pound: Old red cow, with forward horns, appears to have had her left hind leg broken at some time, indistinct brand on right hip, looks like E.P. (2) Young red ox, about 2 years old, no brands, V shape cut out of right ear, and the tip cut off left ear.

Hatting Spruit—(1) Blue-grey gelding, 6 years, 14 hands, branded M.O. near side. (2) Iron-grey gelding, 5 years, 14.1 hands, no brands.

Ndwedwe—Black he-goat, age about 2 years, no brands, no horns. Impounded by Chief Mandhlakayise, Inanda Division, on the 30th October, 1907.

New Germany—Dark brown donkey, long hair, long tail, poor in condition and old.

Thornville Junction—Dark brown (approaching grey) gelding, bles, branded A. L. near shoulder, white socks near fore and off hind feet, shod all round.

IMPENDHLE POUND.

The Pound at Impendhle, which was recently abolished, has been temporarily re-established for the purpose of dealing with certain animals now therein. Mr. J. W. Brooke has been appointed keeper thereof.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustani, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

109a.—Scotchman, 39 years of age, producing good references from his previous employers, desires to obtain on a farm light work, such as bookkeeping, superintending despatch of produce, &c.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor, and C. A. Holwell. Hon. Secretary and Treasurer: H. C. Hitchins. Committee: C. M. Etheridge, R. Fann, J.P., V. Hitchins, S. Aitchison, J.P., W. B. Rethman, Dr. Case, J.P., H. Rethman, R. G. Mack, J. Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer: W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J. Gavin and John W. Harvey, J.P. Hon. Secretary: W. E. Allsopp.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F. N. Meyer. Hon. Sec.: J. Baker. Committee: H. Baker, J. Gavin, J. W. Harvey, J.P., W. B. Turner, H. H. Hutton, C. Baker, H. E. Meyer.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Wiltshire, and T. P. Smith. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, M. Taylor, A. W. Smallie, W. Craig, C. G. Willson, D. G. Smith, A. Grice, W. J. H. Muller, E. G. Woblitz, G. M. de Waal, B. J. Humann, W. H. Doidge, R. Retallack, H. Ryley, H. J. Head, A. S. Pieters, R. R. Mortimer, C. Vermaak, A. E. Norman, W. V. Marshall, H. P. Handley, J. Dyson, T. J. Harvey.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Boehmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schaefermann. Hon. Sec. and Treasurer: Frank J. Volek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T. Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: J. Campbell. Vice-President: A. W. Smallie. Hon. Secretary and Treasurer: R. J. Hearn. Committee: G. Queddon, T. P. Smith, W. A. Helmer, Thos. Brookes, N. Glutz, Wm. Craig, W. R. Qusted, J. A. Brookes, W. T. Heslop, Thos. Dewar, F. Turton, W. H. Tatham, A. E. Norman, D. P. Campbell.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, F. E. Peto, G. Malcolm. Hon. Sec. and Treasurer: G. Palframan, Watermead, Polela. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Yard Steward: H. Brown. Auditors: T. C. Dearlove and T. E. Marriott.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harris, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: G. C. Ways. Hon. Ass. Sec.: A. G. Harris. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo.

Hon. Secretary and Treasurer : Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union : President and James Foster. Committee : F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President : Walter Peppworth, J.P. Vice-Presidents : Daniel Bester, J. G. Bester, Wm. A. Iling, Secretary and Treasurer : Edward V. Bambrick (Box 90, Ladysmith). Executive Committee : A. Brink, J. Farquhar, C.M.G., M.L.A., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, H. C. Thornhill, Herman Iling, D. Munger, P. de Waal, J. H. Newton, D. Sparks, J.P., J. T. Francis, A. W. (Gus) Iling, G. Pinkney, W. Cochrane, George L. Coventry, and *ex officio* officers.

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(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Purchase of Tree Seeds.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Forester, Cedara.

E. R. SAWER,
Director, Experiment Stations.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order, Cheques cannot be accepted.

E. R. SAWER,
Acting Conservator of Forests.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	1½d. each.
Pigs	...	3d. "
Chilling and Freezing Beef	1st week	...
"	2nd	...
"	Remaining weeks	...
Sheep	per week	...
Pigs	...	...
		1s. 3d. per qr.
		1s. "
		9d. "
		3d.
		6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	4s. each (including abattoir fee).
Sheep	...	6d. "
Pigs	...	1s. " up to 200 lbs.
"	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

Cows Wanted.

WANTED urgently, cows just calved or due to calve. Old animals suitable; any breed.

Apply—P.O. Box 282,
Pietermaritzburg.

Seeds for Distribution.

SEEDS of the following have been secured for distribution to farmers at cost price—Cotton, Sugar Beet, Tobacco, Rice, Lupins and Field Peas, Italian and Perennial Rye Grass, Paspalum and Cocksfoot. Varieties and prices upon application to the Farm Manager, C.X.F., Cedara.

E. R. SAWER,
Director, Experiment Stations.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K; Umvoti Location, 2 F.

Fees for Agricultural Analysis.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experiment Farm, Cedara, in accordance with the following scale of fees, which are subject to revision:—

	Scale I.	Scale II.
FERTILIZERS AND FEEDING STUFFS:	£ s d.	£ s d.
Determination of 1 constituent ...	0 7 6	0 5 0
" 2 or 3 constituents ...	0 15 0	0 10 0
Complete analysis ...	1 1 0	0 15 0
SOILS: Partial analysis of a soil in relation to its fertility ...	1 1 0	0 10 6
Complete analysis of a soil ...	2 2 0	1 1 0
WATER: Irrigation and drainage ...	1 10 0	0 10 6
VEGETABLE PRODUCE: Fodders, Ensilage, Grains, &c. ...	1 1 0	0 15 0
MILK, CREAM, BUTTER: Fat only ...	0 5 0	0 2 6
" " : Complete ...	0 15 0	0 7 6
WATTLE BARKS AND TEA: Tannin ...	0 5 0	0 2 6
CATTLE DIPs: Quantitative analysis of 1 to 3 principal constituents ...	0 10 0	0 5 0
INSECTICIDES:		
Qualitative analysis each constituent ...	0 5 0	0 2 6
Quantitative " " " ...	0 10 6	0 5 0

Scale No. 1 is applicable to samples handed in by Merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Department, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis and, where such is deemed of sufficient public interest, to remit such charges.

November 22nd, 1907.

E. R. SAWER,
Director, Experiment Stations,

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

24th September, 1907.

W. A. DEANE,
Minister of Agriculture.

Steam Ploughs.

APPLICATIONS are invited for the services in the various districts of the Colony of the Steam Ploughs recently ordered by the Government.

Applicants should state clearly the position of their farms, and the total acreage required to be ploughed.

The charges will, for the present, be at the rate of, approximately, 10s. an acre in the Midland and Upland Districts of the Colony, and 15s. an acre in the Coast Districts; but the Government reserves to itself the right to vary these charges later on when experience has been gained as to the actual cost of working.

Preference will be given to those districts affected by East Coast Fever, and, again, to those from which the greatest number of applications are received.

Applicants will be advised, as soon as possible after the ploughs come to hand, whether the Government will be able to undertake the required ploughing, and when the ploughs are likely to be available.

H. A. HIME,

Acting Under Secretary for Agriculture.

Department of Agriculture, Pietermaritzburg,
25th November, 1907.

Offers are invited for Two 6-Furrow Spalding-Robbins, Stump-Jumping Disc-Ploughs for Steam Traction. These have had little use, and the frames are as good as new, while the Ploughs were fitted with new ciscs last season. Landed cost of these was £56 each at the Point. Approximate weight, 2,000 lbs.

E. R. SAWER,
Director, Experiment Stations, Cedara.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Acting Under Secretary for Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

- 1.—“Notes on Fruit Culture,” by Claude Fuller. [1902]. (*Out of print.*)
- 2.—“Manures on the Natal Market, 1902,” by A. Pardy. [1902].
- 3.—“Insects in an Important Role,” by Claude Fuller. [1904]. (*Out of Print.*)
- 4.—“Manures on the Natal Market, 1903,” by A. Pardy. [1903].
- 5.—“Weed Circular,” by Claude Fuller. [1905].
- 6.—“Manures on the Natal Market, 1904,” by A. Pardy. [1904].
- 7.—“Tree-planting in Natal,” by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—“Agricultural Co-operation,” by E. T. Mullens. [1905]. (*Out of Print.*)
- 9.—“Potato Culture” by A. N. Pearson. [1905]. (*Out of Print.*)
- 10.—“Manures on Natal Market, 1905,” by A. Pardy. [1905].
- 11.—“Agricultural Statistics, Natal, 1904-5.” [1906]. (*Out of Print.*)
- 12.—“East Coast Fever,” by S. B. Woollatt. [1906].
- 12.—“Manures on Natal Market, 1906,” by A. Pardy. [1906].
- “Agricultural Statistics, Natal, 1905-6.” [1907].

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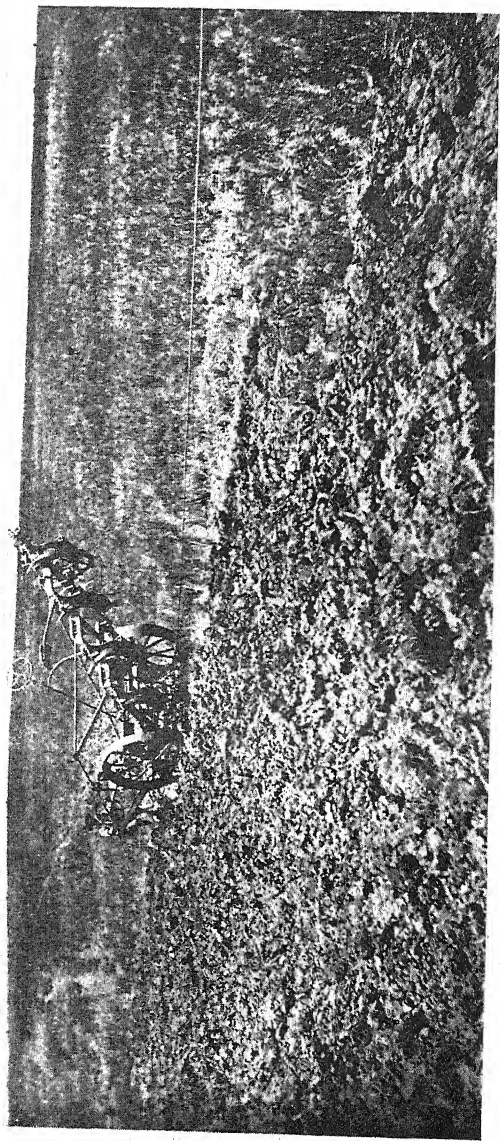
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STEAM CULTIVATION AT MOUNT EDGECOMBE.
The plough at work.

Natal Agricultural Journal and Mining Record.

Perfumery.

By ALEX. PARDY, F.C.S., etc., Analyst.

STATISTICS show that there is quite a considerable importation of perfumes into the Colony in the shape of scents, alcoholic preparations, pomades, etc., and the question may well be asked whether it is not possible in this land of sunshine and flowers to produce some of these ourselves. There is a world-wide demand for perfumes, and, if it is somewhat outside the present resources of the Colony to undertake the production of the highly specialised scents, it appears to be quite possible to produce these in a crude form for shipment to the houses that make a business of purifying, blending, compounding and otherwise dealing with them in order to turn out the inviting array of scents and scented articles for dress, toilet and domestic use.

The preparation of crude perfumery stuffs is a matter requiring a good deal of attention and patience, but the actual labour entailed is in many cases of a very light and pleasant nature and is an occupation fraught with a great deal of interest as well as healthful exercise.

The term "perfume" applies to those substances which emit an agreeable odour. Those of vegetable origin consist mainly of essential oils which are present in the flowers, fruits, leaves, roots or wood of plants,—from which they may be extracted in some manner suitable to the particular plant or part of the plant.

The art of producing or compounding scents is one requiring considerable practice and skill and is only acquired by long experience and special training, but the production of raw material is in ordinary cases

a much more simple process entailing care and patience more than expert knowledge.

Such useful plants as the following are easily reared within the limits of the Colony for this purpose, viz., rose geranium, violet, rose, iris, tuberose, mint, lavender, thyme, anise, lemon grass, citronella, celery, orange, citron, lemon, eucalypts, and many others.

There are several methods employed in the extraction of the essential oils; these usually come under the headings of absorption, maceration, mechanical expression and distillation.

That of the absorption is perhaps the simplest, yet, in some of its modifications, the most delicate method, and is applicable to many flowers. The process has the recommendation of imparting to the vehicle or absorbing agent the true odour of the flower. Freshly gathered flowers are placed upon a layer of pure lard spread over glass contained in frames in the shape of trays which can be piled one on top of the other without injury to the blooms. The flowers are allowed to lie in contact with the lard for from 12 to 24 hours, after which they are thrown out and replaced by a fresh supply. Successive changes are made in this way until the lard has become sufficiently charged with the perfume. The lard is then removed from the glass and packed away in air-tight tins or bottles ready for conveyance. Coarse cotton cloth saturated with olive oil and laid across wire gauze frames is sometimes employed for the absorption of the perfumed oils, and this method is said to give the finest results. The oil is afterwards recovered by pressure.

In the maceration process the flowers are immersed in melted grease contained in a copper or other suitable vessel which is made to stand over a slow fire. The flowers are stirred through the grease and allowed to lie in it and cool for 12 to 24 hours, at the end of which time a further charge of flowers is introduced and the process repeated; recharging is continued until the grease has absorbed the required amount of perfume. The hot liquid is then poured through a sieve to separate out the exhausted flowers from the charged grease.

The productions obtained by the above methods may either be used as pomades or digested in alcohol to produce perfumed extracts.

Under the heading of mechanical extraction, which is applicable to rinds and such-like rich in oil, the material may be rubbed against spikes contained in a saucer-shaped vessel or ecuelle so that the oil vessels become lacerated and allow the oil to exude. The vessel has a hollow tube closed at the bottom and entering the saucer at its top, the whole apparatus resembling in appearance a funnel with the outlet stopped. The tube serves to catch the liquid when it flows to the bottom of the saucer. Another plan is to reverse sections of the peel and subject them to pressure between the fingers so as to cause a rupture of the oil vessels, the exuding oil being simultaneously taken up by a sponge held in the other hand of

the operator; in some cases the material is subjected to pressure by means of rollers or strong presses.

Extraction may frequently be accomplished by distillation, in which case the flowers or leaves are placed in a copper vessel (still) two-thirds full of water and closed up with the still-head, which is connected with a condensing coil. The volatile essence is driven off by heat applied either directly or indirectly, and as it passes through the condenser is collected in a receiver standing under the outlet.

Solvents such as ether, chloroform, petroleum spirit are occasionally employed to extract the oil. They operate by dissolving out the essence as they percolate through a layer of flowers. They have afterwards to be carefully evaporated off from the odoriferous body.

The manufacture of crude perfumes in this way can be carried out on a small scale by amateur flower gardeners and as a side-line by florists, and it may grow to become a professional pursuit giving rise to an industry requiring much labour and expert assistance. There appears to be an enduring demand for most perfumes; and, although many of the flowers employed return only a small percentage of scent, the price obtainable is usually correspondingly high, and this is also the case where the process is tedious and expensive. The industry has possibilities both for those of moderate means and for capitalists; and, as the Colony is capable of producing an enormous variety and quantity of plants yielding essential oils, there appears to be a profitable field open for those with energy and skill to develop the growing and extraction of perfume-yielding plants.

It is said that the chemical industry of Germany, and especially the manufacture of chemical fertilisers, is increasing so rapidly that other European countries are being left behind in this respect. France, Holland, Belgium, and England are not making so much progress as Germany and America.

One of the greatest nuisances in farming, remarks *Massey-Harris Illustrated*, is the way in which weeds are encouraged and protected in the corners of fences and in the vicinity of fences, from which places their seed is scattered over the surrounding lands. The extent to which seeds are scattered from one field to another by high winds proves that one neglectful farmer may annoy hundreds of others by failing to exterminate the foul herbage.

Notes and Comments.

THE COMPLIMENTS OF THE SEASON.—Before these lines meet the eyes of our readers, Christmas will have passed and we shall be looking to the New Year and wondering what 1908 may have in store for us. Another year of commercial depression has come and gone, but there are not wanting signs that the tendency now is upward, towards better things; so that our hopes for a considerably better state of things by this time next year are not without grounds. The past year has seen a great awakening in the minds of the people to the possibilities of this country, and a spirit of patriotism towards our land is beginning to make itself manifest on a greater scale than was ever before known here. That is one of the several good effects of the depression; and when prosperous times do come again we shall find conditions productive of greater stability than before. In the meantime let us look forward and hope for the best; and accordingly, with all sincerity, we wish our readers, one and all,

A Happy and Prosperous New Year.

EXPORTATION OF OSTRICHES FROM TRANSVAAL.—A Proclamation published in the Transvaal *Government Gazette* of the 20th December permits the exportation of ostriches and ostrich eggs to Cape Colony, Natal, Basutoland, Swaziland, and Bechuanaland.

IMPORTATION OF APPLES, ETC., FROM CAPE COLONY.—In consequence of the fact that the codling moth (*Carpocapsa pomonella*) is rife in certain portions of the Cape Colony, the importation, directly or indirectly, overland into Natal of any apples, pears, or quinces from that Colony has been prohibited under Section 6 of the Plants Diseases Act, 1904. The penalty for each offence is a fine not exceeding £20.

IMPORTATION OF PRODUCE INTO THE TRANSVAAL.—With reference to the paragraph appearing in last month's *Journal* (page 1,374) relative to the regulations which have come into force for the importation of produce into the Transvaal, the Minister of Agriculture has since been advised that the words "currants" and "seeds" were inadvertently included in the list of produce that will only be admitted into the Transvaal "if accompanied by a certificate of a Magistrate or Justice of the Peace of the district in which it was produced to the effect that such production was outside a radius of a quarter of a mile from any vine, Virginia creeper, or plants belonging to the family *Vitaceae*."

ALTERATION OF STATION NAMES, N.G.R.—The General Manager of Railways has issued notification to the effect that the names of the following stations and halts will be altered as from the 1st December, 1907:—South Shepstone will be known as Port Shepstone; Mount Rule will be known as Bisley; New Brighton will be known as Island View; Halfway House will be known as Melietuin.

NEW FRUIT PACKING MACHINE.—A new fruit packing machine which, in the opinion of the *Fresno Republican* (California), “promises to revolutionise some of the important processes, not only in the raisin seedling industry, but in the packing of other dried fruit as well,” is being perfected by N. B. Converse. The machine puts seeded raisins, or prunes, or similar articles, into the cartons, weighs them at the same moment, and buttons the package up, doing it more rapidly than it could be done by hand, and, what is also important, perhaps, it does the work more neatly than the woman who packs by hand.

GOVERNMENT VETERINARY SURGEONS.—The retrenchment which has been found necessary by the Government in view of the straitened condition of the public funds, has, as was mentioned in the last issue of the *Journal*, involved a reduction of the staff of veterinary surgeons attached to the Department; and it will be readily understood that, as a consequence of that fact, it will not now be possible to afford the same facilities for the treatment of private cases as have hitherto been enjoyed. It is, of course, the first duty of a District Veterinary Surgeon to attend to the suppression of disease; and, while it is wished that all possible veterinary assistance shall be rendered to private stock-owners, the Minister of Agriculture has found it necessary to instruct the District Veterinary Surgeons that private cases are only to be treated when their services can be given without any detriment to Government work.

MALLET BARK.—The Agent-General for Natal has received and forwarded to the Prime Minister an extract from the correspondence of an importer of bark from Western Australia, which will be of interest to wattle growers in this country. The extract, which is from a letter dated the 28th September, runs as follows: “*Re* available supplies of mallet bark: there are this year about 6,000 tons available, next year there will be barely 2,000 tons. After this for about fifteen years there will only be small quantities available. It will take about fifteen years for the young forests to grow up; the Forest Regulations of the Government prohibit anyone stripping these reserve trees, so that the supply is cut off. There may be more bark available, if the Government build short branch lines further back into the interior; but without these the cost of cartage is too great to pay the present existing price of the article.

CASTOR OIL SEED FROM EAST LONDON.—According to a telegram from East London to the *Natal Mercury* in the middle of November, a sample of locally grown castor oil seed was recently sent to London for report as to its commercial value. The report states that the value, in quantities of 100 tons, is from £10 to £11 per ton, c.i.f. London, and that small lots of 5 tons or more are worth £5 per ton. Large consignments are preferred by the trade, the mills requiring large quantities in order to run remuneratively.

SALT FOR STOCK.—The following reasons why salt should be regularly supplied to farm stock are given by Professor A. P. Aitken, D.Sc.:—(a) Because in the blood of animals there is six or seven times more sodium than potassium, and that the composition of the blood is constant. (b) To keep animals in good health a definite amount of common salt must be assimilated. (c) The excess of potassium salts in vegetable foods causes by chemical exchange an abnormal loss of common salt. This is proved by the fact that the craving of an animal for common salt is most noticeable when the food contains a large proportion of potassium salts, such as wheat, barley, oats, potatoes, beans, and peas. (d) The addition of salt to animal food increases the appetite, promotes the repair of tissue by its searching diffusion through the body, and stimulates the rapid using up of its waste products. (e) Boussingault's experiments showed that salt increases muscular vigour and activity, and improves the general appearance and condition.

SCIENTIFIC AGRICULTURE IN SPAIN.—The general progressive movement in Spain is expressed by a Government order which, we learn from the *Mark Lane Express*, recently created a sort of ambulating school for teaching scientific farming in the remote agricultural districts of the country. The Government order provides for a course of experimental and practical instruction to be given every year by itinerant lecturers, selected from among the agricultural engineers at the district schools of agriculture. In the months of January and February of each year the directors of these schools are required to report to the Department of Agriculture at Madrid, giving the programme of the lectures intended to be given during the ensuing twelve months, with an estimate of the cost, including travelling expenses and remuneration of the teachers, and transport of the agricultural machinery or appliances which it may be considered advisable to carry to those remote villages where the practical instruction is to be given. So far only the Schools of Agriculture at Zaragoza, Jaen, Valencia, Badajoz and Barcelona, and the two stations at Haro and Villafranca del Panades are referred to in this order, but if the movement prove a success it will no doubt be extended, and must lead to a wiser use of modern farming appliances in Spain.

DO FERTILISERS INJURE STOCK?—A series of feeding tests was recently undertaken in Germany, chiefly with rabbits, sheep and cattle, during which the animals experimented upon were fed with superphosphate, basic slag, and kainit. The feeding periods ranged from ten to thirty days, and the amounts of the different fertilisers were graduated according to the size of the animal. The conclusion reached from these feeding experiments is that, under ordinary conditions, neither domestic nor wild animals are likely to eat a sufficient quantity of the artificial fertilisers in question to produce poisonous effects.

KEEPING SWEET POTATOES.—A writer in the *Fruit Grower* (Missouri) says that he has learned of a new way of keeping sweet potatoes. This, he says, is to heat them to a temperature of about 150 degrees for several hours. This kills all the germs and takes up the surplus moisture. Then pile them in a dry, cool place and they will keep like Irish potatoes. The approved manner is to pack them where they will be very dry and warm. Keep the temperature as near 70 degrees as possible. The best way to pack them is in dry sand, road dust, or shavings, or paper. Of course, they must be dug carefully, and not bruised or chilled before packing.

TRANSCAAL MEALIE EXPORT.—According to the Johannesburg correspondent of the *Natal Witness*—writing on the 27th November,—it is stated that the Transvaal Government is so greatly impressed with the success of the Natal mealie exportation experiment that they intend to make a special effort to establish a big mealie growing industry in this Colony. A million sterling is to be spent in settling white men on land suitable for mealies, on lines similar to the tin mining scheme at Potgietersrust—that is, on a profit-sharing basis. The men will be given ground which, if they care to work hard, will eventually become their own. They will be supplied with provisions and tools, and Government steam ploughs will break up the land for them. Arrangements are being made with Delagoa Bay to provide shipping facilities enabling sailing vessels to take grain in bulk (thus saving the cost of bagging), and a uniform railway rate from all parts of the Transvaal will be charged. Hence, farmers living at a great distance from the port will be able to make the same profits on their grain as those nearer the line. The new land settlement scheme will, it is stated, be commenced next year, thus enabling settlers to sow their first crops next spring. It is believed that hundreds of men, who are unable to find work, will be glad of this opportunity of becoming successful farmers. Those who are prepared to work hard will be able, under ordinary circumstances, to make a good living, as mealies can be grown in almost every part of the Transvaal, and millions of acres of virgin soil are available.

THE LAND BOARD.—Readers of the *Journal* may be interested to hear that the Land Board has been transferred to the Surveyor-General's Department, with Mr. C. Meyerheim as Secretary to the Board. Mr. Watson, of the Surveyor-General's Office, takes Mr. Mullens' place as the Government member of the Board. All communications on subjects that come within the sphere of the Land Board should, therefore, in future be addressed to Mr. C. Meyerheim, Secretary to the Land Board, Surveyor-General's Office, Pietermaritzburg.

AN AGRICULTURAL PARCELS POST.—The establishment of an agricultural parcels post in the Transvaal is announced. According to the new system—which will come into force on the 1st January next,—articles produced or—if manufactured—produced and manufactured wholly within the Colony, will be accepted at all post offices in the Transvaal for conveyance by post to any place within the Transvaal at rates varying from 3d. for up to 1½ lbs. to 1s. for over 9 lbs. and not exceeding 11 lbs. The ordinary parcels post is 8d. per lb.; and the rates for the new system are lower than the railway parcels rates.

WHEAT IN MUDEN DISTRICT.—For many years wheat has been grown in various parts of Natal on a small scale, but it has never been considered a crop of any great importance. The reasons for the limited areas placed under wheat in the past have been various; but that the crop will do well in some parts of the Colony is instanced by the fact that, in the Mudén district alone the past season's wheat crop ran into about 200 muids, the price per acre realised on the sale of the grain being £7. The results in that district have been sufficiently encouraging to warrant an extension of the areas under wheat next season; but it is stated by a resident that one of the greatest drawbacks to the cultivation of wheat in his district is the want of a reaper and binder and a portable threshing machine. Considering the excellent prospects the district has in other respects for the production of wheat, we would suggest, for the consideration of farmers in the Mudén district—and elsewhere, for that matter—the co-operative purchase of such machinery as is required. The amount that would be required from each member of the association would be small—providing a sufficient number of farmers could be induced to join,—and the joint owners of the machinery could use it in turn according to the relative positions of their respective farms. The Director of Experiment Stations hopes to publish shortly in these pages a detailed report on a number of varieties of wheat grown at the different experiment stations of the Colony during the past winter. A detailed milling report will also appear shortly; and the results contained in these reports should prove of value to farmers in Natal in deciding upon the varieties of wheat suitable for their particular districts.

OLD-TIME PRICES OF WHEAT.—An interesting list of the mean annual prices of wheat, as registered at Eton College, from 1646 to 1830, appears in the October number of the *Journal of Agriculture* of Western Australia. In 1646 the average price was 49s. 2d. There are, of course, many considerable fluctuations noticeable, the lowest recorded being 22s. 0½d., in the year 1744. In 1743, 22s. 1¾d. is noted, and 23s. 1¼d. in both of the years 1654 and 1688. From 75s. 8d. in 1799 the price jumped to 127s. in 1800 and 128s. 6d. in 1801. In 1809, again, abnormally high prices were experienced—106s. being the mean for that year. For the years that followed—1810-1813—the averages were, respectively, 112s., 108s., 128s., and 120s., falling to 83s. in 1814. In 1817, again, the price was 116s. In 1820 the mean price was 77s., having sunk to 53s. in the interval.

S.A. RAILWAY RATES ON MEALIES.—According to a *Reuter* telegram to the daily press, as a result of negotiations between the Transvaal, the C.S.A.R. and other South African administrations, arrangements have been entered into with the Portuguese and Cape Governments operating from the 1st January next, whereby the maximum rate for the conveyance of mealies for export by any route from any station in the Transvaal or O.R.C., will be ten shillings per Colonial ton. This charge will include delivery to vessels, and other services. Negotiations to the same end are in progress with the Natal Government. A meeting of representatives of the several Colonies interested was to be held at Pretoria to settle details. It is further stated that the conference shipping lines having notified a low uniform rate from South African ports for mealies to London, Hamburg, and other important European ports, negotiations are now in progress with the Transvaal Agent-General in London for the introduction of through booking and sales.

CHESTNUT EXTRACT FOR TANNING.—According to the *Board of Trade Journal*, the Commercial Secretary to H.M. Embassy at Washington has reported that the manufacture of so-called chestnut extract is said to be assuming considerable proportions in the Southern States of America, and to be superseding to a large extent the use of bark for tanning. Since May last, a leading purchasing association in which many leather concerns are interested, with headquarters at Grand Rapids, Michigan, is said to have placed orders for 2,200,000 dols. worth of extract. One of the advantages of the extract lies in the more economical and expeditious handling of it. In an hour and a half a tank car of the extract can be automatically emptied into the storage vats; this amount of extract is equivalent to twelve car loads of bark, which it would take two men four days to handle. The extract, moreover, is ready for immediate use, whereas the grinding and bleaching of the bark would take a week.

SALT FOR DAIRY COWS.—The beneficial effects of salt as an item in the diet of dairy cows is fairly well known among those who have had much to do with these animals, but experiments lately carried out at the Wisconsin Agricultural Experiment Station emphasise the fact that a supply of salt is absolutely necessary if the health and milk supply of the animals are to be kept up. In the observations in question—the results of which are summarised by *Agricultural News* (Barbados) from a Bulletin issued by the Wisconsin Station,—cows that had been deprived of salt soon began to exhibit an abnormal appetite for any small quantities placed before them. After the lapse of a few weeks their health showed signs of failing, with loss of appetite, a generally haggard appearance, and a rapid decline both in live weight and yield of milk. It is satisfactory to state, however, that the animals rapidly recovered from this condition when their normal allowance of salt was again supplied them. About 1 oz. of salt per cow is a suitable quantity to give.

DESTROYING WEEDS IN STANDING GRAIN.—A new method of destroying weeds in standing grain is now being used with success in Wisconsin. This consists in spraying the field with ten per cent. solution of iron sulphate. The first successful experiments were attempted in June, 1906, by the Agricultural College of the University of Wisconsin, under the direction of Prof. R. A. Moore. The idea of controlling wild mustard—one of the greatest pests in Western grain fields—by the use of iron sulphate was conceived last year at the University Experiment Station; and the results of the experiments that were undertaken are described by a writer in the *Technical World*. The work was based on information derived from Germany, where experiments had been tried on mustard; and a sprayer costing 135 dols. was imported from Germany. The tests on the University farm were entirely successful. Professor Moore then experimented on other Wisconsin farms, in Dane, Kenosha, and Waukesha Counties, and at Lynn, Lyons County, Minn., and in every case there was evidence that the weeds had been annihilated, while there was no perceptible injury to the grain. The grains that were tested were oats, barley, wheat, and spelt. No tests have been made on rye in the United States, but Professor Staglick has had success in spraying rye in Europe. Experiments are also being made on meallies, and the results have so far, it is stated, been successful. The only effect that is seen on the grain is the blackening of the lower and older leaves that are doomed to wither eventually, while the young leaves, that bring the cereal to maturity, are unharmed. There are no complaints from any centre of deterioration either in the quality or quantity of the grain crop sprayed. There has been no difference observed in the time of ripening. No tests have been made in America on clover or grasses, but experiments made in Scotland show that in no case was damage done to the young clover or grass,

while the mustard was entirely destroyed. So far, the sulphate of iron solution is found to act definitely on mustard, yellow dock, cockle burr, smartweed, ragweed, and Spanish needles, while, it is said, there is every reason to believe that it will destroy Canada thistle. All indications seem to show that this discovery will go far toward making easier the farmer's lot as well as greatly increase the yield of cereals.

AGRICULTURAL SHOW AT BUENOS AIRES.—The twentieth annual agricultural show of the Argentine Rural Society, held at Palermo—a suburb of Buenos Aires—was, according to the *Board of Trade Journal*, opened on the 8th September, in the presence of the President of the Republic, by the Minister of Agriculture, Senor Ramos Mejia. His Excellency in his speech laid stress on the progress which had taken place in cattle-breeding in Argentina, as was shown by the excellence of the animals exhibited, and he expressed the opinion that in a few years Argentina would not need to import pedigree stock. He stated that the area under grain in the country now amounted to 17,791,200 acres, an increase of 494,200 acres over the area in 1906, and that the present condition of the crops was excellent. The most notable exhibits were in the class of Durham cattle. There was a large class of Herefords, also of very high quality. The horses on the whole were disappointing both in quality and quantity.

TRICHILIA EMETICA ("THUNDER TREE") SEEDS.—A circular letter on the subject of the suggested gathering by natives on the Coast of seeds of *Trichilia emetica*, Vahl., was sent by direction of the Minister for Native Affairs, on the 25th November, to the Magistrates of the following Divisions of Natal and Zululand, viz., Lower Tugela, Inanda, Mapumulo, Umlazi, Alexandra, Lower Umzimkulu, Krantzkop, Umvoti, Lower Umfolosi, Mtunzini, Hlabisa, Eshowe, and Nkandhla. The seeds of this tree—which is our handsomest shade tree—yield an oil of commercial value; and in view of the market which exists locally for the seeds, it is thought that the gathering of them would prove a source of income to natives living on the Coast. The circular letter referred to runs as follows:—"It has been brought to the notice of the Minister for Native Affairs that a possible source of income for the natives on the Coast lands of the Colony may be found in the collection by them of the seeds of the Umkuhlu or Ixolo, otherwise known as the Thunder Tree, botanical name *Trichilia emetica*, which ripen about the months of March or April. Upon enquiry it is found that the Durban Oil and Soap Co. is willing to purchase the seeds at the rate of 7s. per hundredweight (subject, of course, to market fluctuations), delivered at Jacob's Railway Station. It is requested that you will make these facts known amongst the natives of your Division, as opportunity may present itself, through the chiefs and headmen. The seeds should be collected when they fall to the ground, removed

from the husk, and well dried. In order to encourage the natives in the industry with a view to their benefit, it is requested that you will give advice to any who may require it in the matter of forwarding their collections by rail, and in ascertaining the cost of the carriage per hundred-weight."

THE RED GUM (*E. rostrata*).—Despite the fact that there are some 130 distinct species—in addition to countless intermediate species and hybrids—to the average farmer the gum-tree is the gum-tree and nothing more. To what species the gum-trees growing on his land belong he knows not, as a rule, and, knowing little of the commercial value of these trees, he troubles less. True, the Blue Gum (*Eucalyptus globulus*), of all the species, flourishes most widely in Natal at the present time, and its timber has a certain commercial value; but there is another species which, in the opinion of Mr. T. R. Sim, late Conservator of Forests, is "one of the most desirable species to grow on a commercial scale in Natal," namely, the Red Gum (*Eucalyptus rostrata*). This tree shows adaptability to a wide range of situations and conditions, and is described by Mr. Sim as "one of the few species adapted for growing on flats away from the mountains in this Colony, though it succeeds on the mountains also." Gill describes this excellent species thus: "The quality of the timber varies with the kind of habitat. That grown on hilly ground cannot be excelled, though somewhat lighter than that grown in rich, moist land, and, according to situation, the weight per cubic foot varies from 50 to 70 lbs. in seasoned timber. The colour is generally dark-red, hence its name; and though sometimes hard is more easily worked than any other gum. It is admirably adapted for a great variety of uses, either above or under ground, or in water. As fencing posts it will last 30 years and even more, standing unrivalled for this purpose; nor can it be excelled for piles or railway-sleepers when of the best quality, and it resists well both the white ant and the teredo. For shipbuilding, house, and wagon work it is well suited, and also for many minor uses, amongst which it may be noted that it is much preferred for bullock yokes, as it wears smooth without splintering. As a timber for furniture, especially veneers, selected pieces are admirably fitted, the mottled and wavy figure often met with being singularly beautiful; when very dark it frequently resembles the best mahogany. It also makes good blocks for street paving, and an excellent material for parquet flooring. Single trees when felled and converted into sleepers have occasionally produced as many as 100, 220, and even 250 sleepers of the dimensions of 6 feet 6 inches by 8 inches by 4½ inches." Maiden writes of it: "It is the tree which produces directly to the Colony [i.e., New South Wales] by far the most revenue of all our trees." In California the Red Gum has been widely cultivated, in varied situations, generally with success. We learn from the *Rural Californian*

of a recent date that one of the finest office buildings in Los Angeles is finished in Red Gum. At the mills there the wood goes under the name of "Australian mahogany"; and for interior finish, our contemporary remarks, it "is not surpassed by any material in the market, either in beauty, durability or market value, for the price paid for this lumber was 256 dols. [£53 6s. 8d.] per thousand feet." It is remarked that the unusual beauty and durability of this wood for use in high grade finishing of all kinds has set a remarkably high price upon it, and it is anticipated that, in the near future, there will be a heavy demand for high-grade eucalyptus timber.

Natal Mealie Export.

SOME LONDON OPINIONS.

DISCUSSING the newly-awakened activity in the exportation of maize from Natal, *South Africa* says: "While coming seasons may not offer the same inducement in respect of very high prices, there will always be a good market in London for the grain, and the South African Colonies must be prepared to secure their share in this market by exporting in much larger quantities, and by making up in the bulk the turnover for the proportionately smaller profits. The difference of the seasons will enable South Africa to supply the European market at a time of the year when fresh North American mealies have ceased to compete. . . . The South African article has made an excellent impression on the European market, and is subject to no disadvantages that do not apply to maize from other parts of the world. Indeed, in several respects, it is reported as superior to the North and South American article. For these reasons, South African growers and exporters should do their best to increase the quantity and the regularity of the supplies, while, of course, keeping up or even improving upon the present quality."

A representative of the same journal recently obtained the views of various people intimately connected with the London corn market respecting the importation of mealies from Natal and the precise causes of the high prices that have been realised. While all admitted the hopeful character of the new movement, there was a general disposition to avoid prophecy as to the ultimate result.

The editor of the *London Corn Circular*, a leading organ of the trade, stated that conditions during the past season have been abnormal. "There have been no such prices for many years," he said, "and while it is fairly safe to say that the high rate will continue on the present crop, next year may see a drop of 5s. to the average. The American crop has been poor as to quantity and quality, and even last season's yield was indifferent." The white African variety was described as a very bold, floury grain, and worth 6d. to 1s. per quarter more than the American maize. Although there is a prejudice against South African mealies on account of their being less known, the opinion was offered that if regular supplies were forwarded, they would obtain a firm hold on the British market in three or four years. A parallel case was instanced. Rangoon haricots on their first appearance met with nothing but hostility from the buyers, but by the perseverance of the shippers, they have now come to the front. Replying to a question as to the best means of making the brands known, it was stated that there was nothing like a good market for the purposes of publicity in such a case. The maize should be allowed to sell on its merits while there was a demand, and should not be held back for a price which the buyer refuses to pay. As a staple article it would be rapidly distributed, and with showy-looking stuff like the Natal mealies, inquiries would soon be made, thus leading to a regular trade. It was added that South African maize germ meal, which has been coming to hand in small quantities during the past three months, has created a very good impression, the latest price being about £6 7s. 6d. per ton. It is regarded by English stock-keepers as an excellent food.

A member of the firm of R. and W. Paul, Limited, was somewhat more critical. He said that while the mealies came in their present condition people would buy them readily. When the maize arrived it looked very nice, but it showed traces of weevil, and the longer it stayed on their side the worse it became. On that account many firms would not take it, the Omnibus Companies objecting to it on that ground. "There are very few American mealies coming in" was the concluding remark, "and there is every hope of creating a solid trade with South Africa if we can get anything like a regular supply. If the stuff comes in fits and starts no progress will be made. Putting the American and Natal mealies together there is very little to choose between the two. The African variety is always dry, and if the American should be in bad condition its rival will have every opportunity of getting the best of the market."

Messrs. Berry, Barclay & Co., who have been handling a quantity of Natal maize, held similar opinions to those mentioned, emphasising the importance of keeping the weevil in check as much as possible. It was agreed that the British market can absorb practically any quantity provided the quality is maintained.

Exhibitions of Colonial Fruit, etc.

ROYAL HORTICULTURAL SOCIETY'S SHOWS.

WE are pleased to be able to draw the attention of fruit growers in Natal to the exhibitions of Colonial-grown fruit and vegetables (both fresh and preserved) to be held in London during 1908 under the auspices of the Royal Horticultural Society. Three shows will be held during the year, namely, on the 5th and 6th March, the 11th and 12th June, and the 26th and 27th November. No entrance fee or charge for space is made, and tabling is also provided free of expense. Furthermore, any produce may, if so desired, be consigned direct to the Society, and it will be stored in the cellars at Vincent Square and staged by the Society's officials, but the Society will not undertake to repack or return any exhibits. The entries close a week before the show in each case.

The following schedule will apply (as far as possible) to shows of Colonial fruit and vegetable produce:—

DIVISION I.—COLONIAL-GROWN FRUIT AND VEGETABLES.

Medals or other Prizes will be given, at the discretion of the Committee.

Awards will be made in Classes 2—24 only when staged separately from Class 1, and not when included in it.

The Colony in which the Fruit has been grown must in all cases be stated.

- Class 1.—Collection of Fruit and Vegetables.
- Class 2.—Collection of Apples (Dessert).
- Class 3.—Collection of Apples (Cooking).
- Class 4.—Collection of Pears.
- Class 5.—Pineapples.
- Class 6.—Bananas.
- Class 7.—Mangos.
- Class 8.—Grapes.
- Class 9.—Oranges.
- Class 10.—Limes and Lemons.
- Class 11.—Shaddocks, Pomelos and other like Fruits.
- Class 12.—Peaches and Nectarines.
- Class 13.—Plums.
- Class 14.—Melons.
- Class 15.—Tomatos.
- Class 16.—Nuts.
- Class 17.—Yams, Sweet Potatoes, and other Tubers.
- Class 18.—Vegetables other than Tubers.
- Class 19.—Any other Colonial-grown Fruits or Vegetables.

DIVISION II.—COLONIAL-GROWN PRESERVED FRUITS, JAMS, ETC.

Dried or preserved fruits of any sort or kind may be shown, subject to the condition of their being tasted by the judges, and of their being grown in a British Colony. Exhibits in Classes 20—23 must not occupy a space greater than 8 feet by 6 feet, and must not be built up more than 2 feet high in the centre. All alike must be Colonial grown and Colonial prepared.

Class 20.—Colonial Grown and Bottled Fruits (in clear glass bottles).

Class 21.—Colonial Grown and Tinned Fruits.

Class 22.—Colonial Grown and Dried Fruits.

Class 23.—Colonial Grown and Preserved Vegetables. (Either bottled, tinned or dried.)

Class 24.—Colonial Grown Fruits made into Jam, Jelly, Syrup, etc., in the Colony, and shown in clear glass bottles.

The judging will take place at 11 a.m. on the first day of each show, unless otherwise notified to the exhibitors. The Secretary of the Royal Horticultural Society, Vincent Square, Westminster, will be pleased to furnish intending exhibitors and others with any information and to forward entry forms and schedule.*

These exhibitions were originally organised in 1904, and have been the means of bringing before the British fruit merchants and fruit-consuming public the extensive resources of the British fruit markets quite independently of the foreigner. The Society's object in organising these shows is the advancement of the interest of the Colonies (*a*) by stimulating the production of better fruits; (*b*) by giving advice and assistance in the difficulties ever confronting fruit-growers; and (*c*) by helping to inform the home market. The results have been encouraging, for even in so short a time as the last three years a distinctly better quality of fruit has been sent, those recently shown being of an improved appearance, less blotched by fungus, scale and other defects, and better packed. At the present time, when efforts are being made to increase the production and export of Natal produce, these exhibitions afford admirable opportunities to Colonists for advertising their wares in Britain; and, with the facilities which the Royal Horticultural Society is offering, there should be a good display from Natal. It is absolutely necessary, however, if business is to result, that the exhibits should be accompanied by full particulars as to cost, etc.; and it should also be stated on what terms exhibitors are prepared to execute orders for delivery in the British Isles.

* We have a limited number of copies of the Circular issued by the Royal Horticultural Society, which will be supplied to those interested upon application.

Inter-Colonial Agricultural Union.

ANNUAL CONFERENCE, 1907.

CONTRARY to our expectations we were unable to give, in the October issue of the *Journal*, a report of the proceedings of the recent Congress of the Inter-Colonial Agricultural Union. The November issue of the *Farmers' Advocate* (the official organ of the Union), however, contains the official account of the proceedings, and we are accordingly able to publish in this issue an account, condensed from the official report, of such portions of the proceedings as are likely to interest Natal readers.

The Third Annual Conference of the Inter-Colonial Agricultural Union of South Africa was opened on the 30th September, 1907, in the Town Hall, Pretoria. The following gentlemen, representing the Colonies mentioned, were present:—

Cape Colony: Messrs. C. G. Lee (President), Thos. P. Theron, P. J. du Toit, O. E. G. Evans, A. W. Douglass, H. J. Collett, W. Edmonds, W. van der Bijl, R. H. Struben, W. A. Krige, E. T. L. Edmeades, H. H. Hards, D. M. Brown, S. A. Cloete, P. W. Michau, F. D. MacDermott, (Secretary).

Natal: Rev. Jas Scott, Messrs. E. W. Evans, J. Moon, J. Marwick, J. M. van Rooyen, H. Wiltshire, T. W. Dukes, G. L. Coventry, C. E. Hancock, C. H. Mitchell, W. Craig.

Transvaal: Messrs. J. E. van der Merwe, A. G. Robertson, T. Smuts, W. H. Poultney, W. M. Struben, E. W. Hunt, I. van Alphen, J. J. Enschede, H. Mentz, R. G. Nicholson, T. M. Cullinan, L. Bagshawe-Smith, W. Harvey, J. G. Beverley, H. T. Hall, F. J. van Zijl, N. Lombard, P. J. Rosseau, W. E. Macmillan, F. A. Noyce, A. H. Malan, Thos. Everard, F. P. van Deventer, W. Pott, Th. Zurcher, W. H. Turner, A. H. Halford, F. T. Nicholson.

Orange River Colony: E. M. Ellenberger.

Rhodesia: J. A. Edmonds.

Mozambique Territory: Signor J. M. T. Valdez (Consul-General for Portugal).

Government Representatives: Cape Colony, J. S. Borthwick, W. Robertson, P. J. H. Hannon, C. P. Lounsbury. Natal, Claude Fuller. Transvaal, F. B. Smith. Orange River Colony, E. J. MacMillan, J. Morgan.

There were also present, among others, the Hon. J. C. Smuts (Colonial Secretary of the Transvaal), Mr. J. J. Kirkness (Mayor of Pretoria), various members of the Pretoria Town Council, and other prominent citizens of Pretoria.

The President (Mr. C. G. Lee) briefly introduced the Hon. the Colonial Secretary, who, owing to the indisposition of the Right Hon. General Botha, Premier of the Transvaal and Minister of Agriculture, had attended for the purpose of opening the Conference.

General Smuts, on rising, said it afforded him the greatest pleasure to welcome the delegates on behalf of the Government of the Transvaal. They were engaged in a most important work—a work on which to a large extent the future of South Africa depended. For many years the agriculturists of South Africa had been jogging along in the old rut, but they had felt, under the stress of circumstances, that the time had come to go in for new methods, and the Inter-Colonial Union was proof of this new spirit. They had gold mines and diamond mines and propositions of other kinds spread all over South Africa, but in the long run the greatest interest of South Africa would be agriculture. They had noticed in recent years a cry from the various Colonies for the development of local industries; but this could be of no avail until agriculture was prosecuted very much more vigorously. They could not have artificial industries. Sometimes a country was geographically so situated that it was bound to develop manufactures for which it had not the raw material. South Africa was not so situated; they must devote themselves first of all to primary production, and once they had the raw material they would be able to establish local industries. Therefore the representatives of agriculture were leading in the van, and on their success would depend the future of South Africa. If stock farming and agriculture flourished they would find themselves in possession of the raw products which could be worked up in industries. They would then also see cheaper living, and the exorbitant prices of the necessities of life would be greatly reduced; a large white population would be attracted, and South Africa would get back in a thousand ways what the farmers had put into the country.

He need not tell them that the Government of the Transvaal, like every other Government in South Africa, would be only too willing to help them in any manner possible. There were different ways of helping—there was also a way of helping a man into the ditch. No doubt in the past assistance had been given to the agriculturist in entirely a wrong direction. They could not fight economic laws, but must make progress along sound business lines. To this policy, the Transvaal Government was pledged. All wisdom, however, was not concentrated in the Governments of South Africa—on the whole Governments were rather foolish. The Governments looked to them, who were not lawyers or theorists, but men who knew the practical needs and the practical possibilities in respect of agriculture, to give them the necessary advice, and devise the means to assist the farming industry in every way possible.

As he had said, they had to strike into new paths if they desired to be successful on a large scale. They had not only to improve on the

methods which had been in vogue since times almost primordial—they had to have new experiments and investigations to see what was best adapted to the country. He cited the case of the Argentine Republic, which the cultivation of lucerne had raised from the position of one of the poorest States in America to that of a country which was helping to supply the world with meat, wheat and other things. In South Africa in some ways they had tried new things with success.

OSTRICH FARMING

in the Cape twenty or thirty years ago had been in a very bad way, but the people had stuck to it, and in spite of depression and a slump in the feather market the result was that to-day a large part of Cape Colony subsisted on ostrich farming. He considered this industry had not been tried on as large a scale as it would be in the future, and though he did not want to discourage his friends from the Cape Colony, they in the Transvaal were beginning with ostrich farming. On a number of farms on the low, middle and high velds it had been started with very encouraging prospects, and there was no reason to doubt that the time would come when the Transvaal would have a large production of ostrich feathers. He did not think that they need be afraid of such competition, for he did not believe in the fear that ostrich feathers, as being an article of luxury, would fall in price. The same had been said in the old days of diamonds, but though the production had been trebled the fear had not been realised.

Then there were other lines. Large portions of South Africa were what was termed low veld, and were almost semi-tropical, and there they could start farming on different lines to what they were accustomed to in the high lying portions. He had recently passed through some of the low-lying portions of the Transvaal and also the East Coast, and it seemed to him that South Africa had tremendous chances before it. He had seen cotton fields in Portuguese East Africa which were, he had been told, as good as any in the world. The information was that the nature of the soil bore traces of its cultivation hundreds of years ago. Why not go in for cotton growing? Why not go in for fibre growing in the Transvaal? Fibre trees would grow anywhere, and if they put them in it would be creating a new source of production and revenue far greater perhaps than ostrich farming or other things they were at present proud of. Castor oil too could be enormously produced here. The only problem was the clearing away of the bushes. They need not produce castor oil to drink. It was consumed in South Africa to an enormous extent as a machine lubricant. Oil was imported to the value of many thousand pounds worth each year, and it could all be produced here.

Those were the openings before them which would lead to a revolution in the economic aspect of South Africa. They should not be too conservative. Farmers were conservative all the world over and thought

that they had a monopoly of wisdom. They were now learning that the clothopper was not the best man. They were learning that intelligence counted for much, and that knowledge was power. There was a strong feeling in South Africa in favour of experiments. He would like to point out that in trying to produce as much as possible they should never forget

THE QUESTION OF QUALITY.

It was an important question. To-day they had not sufficient sheep to supply the country with mutton, but that could not last much longer. In a couple of years' time they would have sufficient sheep to supply the needs of the small white population, and if they did nothing but increase their flocks they would not know what to do with them. They should not look merely at quantity but at quality. During the war South Africa had practically been cleared of stock. The Transvaal had been more denuded than the other Colonies, so it had a better chance of starting afresh with good stock. If they started with a good class of sheep they would not only have the mutton, but also the wool, and wool would always maintain its price as it was not a luxury but a necessity. They would never produce so much wool as to lower prices. They had a resolution on the agenda in favour of the reduction of rates and freights. That was laudable, and was a desire which was warranted on their part and which should be acceded to. As an illustration of how they might produce without it being to their advantage, he would like to point out that in South Africa there was a large consumption of wine and brandy. Now, in the Cape Colony they had an enormous production, but because their friends had not paid careful attention to the question of quality they to-day sat with their wine and found that their Government was also sitting. He remembered a personal friend in the Colony who always measured his work by the quantity he could produce. One year he produced 100 leaguers and 200 the next, and he thought himself successful. The farmers in the Western Province were to-day reaping bitter fruits, and were revising their methods, with the result that the quality was improving. There was no reason why the wine of the Cape Colony should not be consumed here. The day would come when they would be ashamed of drinking the wine of France or —(turning to the Portuguese Consul-General)—that which comes from Portugal. They would drink the wine of their country because it would be equal to, if not better than, that which was imported. He was glad that more attention was being paid to quality, and they in the Transvaal should do the same. The day would come when their quantities would become embarrassing and quality would help them. He had been told that the English farmers who supplied the markets in England now found that the frozen mutton from the Argentine was cutting them out because the imported meat was of a better quality. He hoped they would be careful and keep that before them.

They had, however, to cope with

NUMEROUS DISEASES

which were devastating South Africa, and which constituted their greatest problem. He did not know whether this country was unique—in moments of despondency he thought that this country was unhappier than others were. Towards the end of February last there had been a prospect of an immense production of mealies, which, if reaped, would have meant an enormous change in the economic conditions of the country. But in one month the country suffered enormous loss. The locusts came from the Cape Colony—and the loss they caused was incredible. A careful estimate of the losses incurred in one district alone had reached £219,000. And that was solely due to locusts. Then they had scab pretty nearly all over South Africa, East Coast Fever had nearly devastated the Transvaal, and was now busy in Natal. Then they had other pests, and they had to fight these things. It was discouraging to the farmer to find that all his labours bore no fruitful results. That was where the Inter-Colonial Union could do much good work. The pests were Inter-Colonial, and were not confined to any particular Colony. He could not impress upon them strongly enough that if South Africa had to go ahead the Government should exert themselves to the utmost to stamp out the diseases in all parts of the Colonies. The fight against the locusts would have to start soon. If the Transvaal and the other Colonies did their best to stamp out the locusts they might succeed, as the United States had succeeded in eradicating the locusts from Kentucky, where they had been particularly bad. Other countries had coped successfully with locusts. They should spare no expense and no trouble in doing the same, and should put aside the idea that locusts were part of fate. For thirty or forty years lungsickness had ravaged the Colony, but now there was not a single case in the Transvaal. They had succeeded by a big effort, and during the past two years there had been no cases, although they ran the risk of importing them. The Cape Colony was unfortunately

ROTTEN WITH LUNGSICKNESS,

and the unfortunate people there had bullied and hectored the Transvaal Government to permit them to send their stock to the markets here. No doubt the Government was thought hard-hearted and selfish in refusing this, but they had to protect their own stock. It was not a policy of selfishness, for the Transvaal was prepared to consume what the Cape produced, but when it came to sending lungsick cattle to the Transvaal they had to be careful. The Transvaal had succeeded in stamping out lungsickness, and why could the Cape Colony not do the same? There was not that spirit of practical co-operation they spoke of so much. When they could benefit themselves at the expense of a neighbour they did so. They wanted effective measures taken, and if such measures were to be successful they

must put a stop to that sort of thing and must do their best to help one another and not try and send diseased things to the other Colonies.

They should go in more for

BACTERIOLOGICAL RESEARCH.

He saw that last year the Union had passed a resolution in favour of the establishment of an inter-colonial bacteriological laboratory. He did not think that such an institution was necessary for the reason that the question of research could be carried on by the various Colonies independently. Here in the Transvaal they had been prosecuting research into animal diseases for some years, and they were fortunate in possessing such a man as Dr. Theiler, who had carried out his investigations with brilliant results. The Colonies should do their duty and not expect one Colony to spend large sums of money while they wrote paragraphs to the newspapers. Dr. Theiler had assured him that every disease rampant in South Africa could be stamped out, and he thought that they should be animated by that spirit of optimism.

Another subject he wished to touch on was that of

AGRICULTURAL EDUCATION.

They had passed a resolution in favour of rudimentary agricultural education being given in the schools. They in the Transvaal were going to make an experiment in that direction, and hoped to arrange at four places for rudimentary agricultural teaching of a practical as well as theoretical nature. If it answered they would extend it to other parts. Theoretic teaching alone was not good, and did not fit a man for life. If a man was to be successful as a farmer he should be trained up to be a farmer. In that way would they make farmers, and so prevent the exodus of intellect to the towns. When once they gave the right sort of education to the countryside the promising boys would stay there. They had to proceed further and establish agricultural colleges all over South Africa. In the United States of America a revolution had been created by the establishment of experimental stations and agricultural colleges. The day would come when they would have the sons of the soil doing the Colony's agricultural work. They were still importing men, and good men too, but the day would come when their sons would fill those positions. The Government's idea was to found an agricultural college in the Transvaal. A portion of land had been given by the late Mr. Beit to which the Government had added another portion, and he fondly hoped that the school would be the best in South Africa. They, however, needed more than one institution in South Africa. The delegates from the other Colonies should urge their Governments into doing this.

There was one thing that was encouraging, and that was the new spirit of

AGRICULTURAL CO-OPERATION

which was moving over South Africa. The agricultural community were leaving their ancient ruts and were taking to new paths. He was glad to see it, and hoped they would help the Governments of South Africa to foster co-operation in a wise way. It was difficult to find what line they should follow. They could not move by simply copying Denmark and other countries. Co-operation was a spirit—a method. It was like religion. A man could not be made religious; and he had to grow up into co-operation. In older countries youngsters saw how their fathers worked together and followed the example when grown up. If they could not copy other institutions they could at least do the best for themselves. Experiments in this direction were being made in the Cape Colony, O.R. Colony and the Transvaal, which helped them materially, and he hoped the time would come when they would be better able to help the people.

After all, there was one great aspect to consider, and that was that South Africa could only move ahead if there was union. No trouble was local or confined to one Colony—it was inter-Colonial, and they had done right in establishing the Union. There was only one road towards making South Africa one, and that was by unity. They should combine. They were geographically one, nationally one and politically one. They should have not only agricultural unity, but political unity, and most of the evils they were coping with would disappear.

In the name of the Government he welcomed them, and hoped that they would reap the fruits of their labours in the days to come.

Before proposing a vote of thanks to General Smuts, the President introduced the Mayor of Pretoria, who very heartily welcomed the delegates to Pretoria. He referred to the Colonial Secretary's address as "an able, instructive, practical and hopeful speech," and hoped that the deliberations of the Congress would be fraught with important results.

The President said the Colonial Secretary had given them a wide field for fruitful thought, consideration and study. He had laid before them facts of the greatest moment, and of vital importance to their children. He need not go farther than to state the broad view of what had been said, because the details would gradually be unravelled out during the deliberations of the Conference. The welcome which had been given them was calculated to promote the growth of that tender, that valuable plant—unity—which everybody in South Africa was so anxious to see fostered and growing. He highly appreciated the facts dealt with by the Colonial Secretary. Many of them might not be very pleasant to some of those present, but they knew, when the unpleasant matters were taken with the pleasant, that they were having the truth placed before them. The welcome extended to them would have an effect not only on the delegates, but would be read all over the other Colonies. Mr. Lee con-

cluded by proposing votes of thanks to the Colonial Secretary and the Mayor.

This was seconded by the Rev. Mr. Scott (Natal), and carried with hearty applause.

PRESIDENT'S ADDRESS.

The President then delivered the following inaugural address:—

"Gentlemen,—In welcoming you to the third annual Congress of the Inter-Colonial Agricultural Union of South Africa, I feel that I must first congratulate you upon the apparent fact that our Union is growing both in strength and importance. In the face of the representation here, it would be positively ungracious not to express the full belief which I hold that this Union is bound to become a power for good, not only to the pastoral community of this country, but to the general community as well. Any country that has farmer citizens willing to give time and thought to building up associations and societies of the kind represented here, has solid reasons for great hope for its future. It must ever be encouraging to know that this country has farmers and others interested in the land and possessed of such patriotism as causes them to lay aside their more direct private affairs and to gather here, practically at their own cost, for the general welfare. Our future possibilities are further rendered immeasurably great when such keen interest is shown in the land by the various Governments represented here to-day through their scientific experts and officials. Last year, when we met at Capetown, the number of States represented was but three, namely, the Transvaal, Natal, and the Cape Colony. To-day we assemble as representing practically every State within the sphere of British rule south of the Zambesi, and if we can progress along the lines hitherto laid down, there is no reason to doubt but that we shall ultimately hold our annual conferences as representing the whole of the sub-continent, with delegates from the other States within those boundaries which owe their allegiance to other Governments.

"Without wishing to appear to be anxious to apologise for the existence of this Union, I trust I may be pardoned if I devote a few words to showing how imperatively necessary an organisation of this description has become in the peculiar conditions of this country. We have a large extent of land, for the most part very sparsely populated. We have political boundaries and divisions which we all trust may some day disappear; but meanwhile we have to recognise the facts as they are. We have a large native population scattered all over these territories, a population which should yet prove a source of great wealth and assist in forwarding the well-being of the State, if it can only be properly handled. We have a country which is naturally rich in many respects, but it seems the fate of every effort to wring prosperity from its soil—whether in the form of mineral, pastoral, or agricultural products—to be faced with more than the usual share of difficulties. In other words, it is, as your Presi-

dent last year stated in his opening address, 'a hard country.' It is not for me to dilate upon the obstacles and difficulties which have been met with in the course of the development of the great industries; it should be sufficient for me to touch upon some of the troubles and difficulties which the farmers have had to face, in order to convince all who will take the trouble to look dispassionately into these questions for themselves, how necessary it is for us to

COMBINE AND WORK TOGETHER,

district with district, and State with State, in order to reach the goal we are all, I trust, aiming for. This goal, so far as the farming community is concerned, is, I take it, increased production and a natural enhancement of the permanent wealth of the State. The questions which affect the farmer in any country affect, both directly and indirectly, every section of the population among which he lives. The exploitation of very rich mineral deposits may be taken as an exception to this rule, for in that case, for the time being at least, the miner may be, to a large extent, independent of the local producer. But in the end, even the richest mineral deposits become exhausted, and when that time comes, it is a poor look-out for the State if permanent industries have not been firmly established to take their place. So no matter how one looks at this question, the only really permanent wealth of the country is its soil and the people upon it. It is therefore certain that if we in South Africa are to build up, as we hope to do, a powerful and united people, it is our duty to do all we can to lay the foundations of permanent prosperity by encouraging and forwarding in every possible way our natural industries—in other words, farming in all its various forms, and the production of foodstuffs, animal products, and, as far as possible, every kind of raw material for the manufacture of textile fabrics. The only reason why we should do this is because by no other way can our permanent prosperity be secured. We stand in the simple position of the man who intervened in an argument as to why the ladies made such a fuss about food. The unanswerable solution of the question was that he supposed we lived by it. Our position is that not only do

WE LIVE BY AGRICULTURE,

but the whole world is in the same dire strait; and, so long as human nature is as it is, we shall have to depend on agriculture for the bread and meat we need for our support, as well as for the clothing we wear and everything else we use, whether necessities or luxuries. For even luxuries are the product of human skill, and those valuable gifts would be of little account were there no foodstuffs to maintain the bodies of those who use them. So that, look where we may, everything in this world comes ultimately back to the soil.

"Now, gentlemen, when we start with these admitted facts and try to

think out the future of a country like South Africa, there seems at first sight very little prospect beyond the mineral resources, for our pastoral and agricultural pursuits so far have been carried on under such difficult conditions that, judging by the import returns, we have never yet succeeded in feeding ourselves, let alone growing sufficient in the shape of agricultural produce to exchange for the imported articles we consume. This is a lamentable admission to be compelled to make, but instead of being a cause of discouragement it should, in my opinion, act as a spur to us all to so organise our work that this state of things may be changed. It has always to be remembered that we are following in the footsteps of some of the greatest pioneers the world has known. To those who went before us and carved out homes for themselves in the wilderness of Africa, as it was then, our position to-day is that of affluence and luxury. If we could conceive the return of the voortrekkers to life as young men, and their being placed in the conditions which surround the average South African farmer to-day, we can imagine them being a little impatient at many things, and sighing perhaps for the freedom and expansiveness of the old life, but we cannot imagine them finding fault with the facilities provided for getting their crops and stock to market or the help and sympathy which is so rapidly developing, all over the country, for the farmer and his difficulties. Not that I think we should as a consequence be content because the conditions are better and more favourable than were those of our forefathers, and sit down without making further efforts towards improvement. There are many things which have yet to be done which must have a great effect upon all agricultural activity in this country, and some of these I hope to see forwarded at this Conference.

First and most important of all among the many labours which have to be accomplished is the encouragement and rehabilitation of our great stock industry. In glancing through the agenda I see that this section has not been overlooked. We have only to consider the position of the stock industry of this country, as many of us have known it in our own times, to realise how much can be done in this direction towards resuscitating the agricultural credit of the country. It does not call for the memory of the oldest inhabitant to tell us of the ravages of stock diseases, many of which but a few years back were a complete mystery in their occurrence even in the greatest minds in the scientific world. I have but to mention a few of these scourges to impress you with the important part they have played in throwing the whole country back at various periods. When we think of the terrible decimation of our herds by redwater and rinderpest, and later on by an even more virulent pest in the shape of African Coast Fever; of the enormous losses the country still suffers from horse-sickness; and again of the dread disease known as heartwater in sheep and goats which has rendered farming with small stock next to impossible in many parts of the country; one is almost tempted to think that

such a thing as the establishment of any form of animal industry on a large scale is utterly impossible. Yet, gentlemen, the longer we live the more it is being forced upon us that not only should it be possible to reinstate our animal industries as they existed before the pests I have mentioned assailed them, but by care and forethought to so establish them so that they may yet prove the salvation of South Africa. Other countries have had similar troubles and overcome them without the knowledge which we have now at our disposal, thanks to the great attention which has been attracted to us on the part of the scientists of the world by these very afflictions. It is a scientific age, and if we are wise we shall take every advantage of the knowledge which science is daily putting into our hands. If we do this we shall be assured of successful methods of fighting most of the plagues which have hitherto oppressed us. When we come to think of the truly great work done for us by the late Dr. Hutcheon, the pioneer of veterinary science in South Africa, whose memory should be revered for all time by every stock-farmer and owner of animals in this country; when we add to that the further efforts of those who, like Mr. Lounsbury, in his investigations into the life history of the ticks gave us the clue to many of our troubles; and of Dr. Theiler and his great work—and the many others who are still with us giving of their best for the good of the whole community—I maintain that there is great room for hope and the liveliest faith in the future prospects of pastoral farming, as the one essential industry.

If we consider the position impartially to-day, we may take comfort. We are in the midst of a great depression; the country seems to be passing through a

PERIOD OF TRANSITION.

Yet on every side we find that though the farmers are partaking in the general trouble, as a whole they are suffering less than the bulk of the other sections of the people. My firm belief is that the reason for this is because agriculture is beginning to regain some of its lost ground; and this is largely owing to the fact that we can now face with a certain amount of equanimity many of the troubles which used to threaten us with complete ruin a few years ago. I am speaking now from the standpoint of the stock-farmer. For all that it will not do for us to sit still and leave the great work of rehabilitating our industries to the hands of others. We must be up and doing, and while the scientist works in his laboratory and continues his elaborate experiments for our ultimate benefit we must give him every encouragement and support. This can be done in two ways. The one is by the prosaic method known as 'going to the Government' in order to secure ample funds to bring them to a successful issue. The other and more important is that of intelligently watching the progress of events and adapting ourselves with care and thought to the new methods which are introduced from time to time.

"It is safe to say that had the pastoralists of South Africa taken full advantage from time to time, of the opportunities offered by science, for the prevention or eradication of disease, South Africa would have been richer by many millions to-day. I have a lively recollection of one particular incident which will remain with me till the end of my days. In the early periods of the Angora industry of the Cape we managed to import a contagious lung-sickness from Asia Minor, which is a great scourge in that country. Fortunately for this industry the late Dr. Hutcheon took the matter in hand in its beginning, and by the drastic measure of slaughtering all infected animals, and isolating all which had been in contact with them, succeeded in stamping out that disease, and it has never been seen since. Had we, for instance, taken lessons from this and at once tackled lung-sickness in cattle in the same way, how many millions of head of stock should we not have saved during all the years which have intervened. This policy is now being gradually adopted in many parts of South Africa, and if carried out with care and circumspection, should soon show good results. It is for us to support measures of this description, and though it may appear to bring hardship in its train at first it must ultimately react to our own good.

"Take again the practical side of our industries. We are all now, I trust, taking more care of our stock than we used to, and what is of more importance, trying to

BREED AND REAR A BETTER CLASS OF ANIMAL.

The day of the unprofitable animal must pass away when once the farmers begin to realise how much more advantageous it is to keep and feed the profitable one. We have plenty of encouragement to do this if we only look at the enormous quantities of foodstuffs imported every year. I am aware, none more keenly, that many of our farmers, particularly in these northern districts, are not enjoying the prosperity that is the lot of the stock-farmer. But their day will come, too, if we can only gather together in meetings like this and bring the whole force of the intelligence of the country to bear on the great problems which have to be solved before all our troubles can be conquered.

"The agriculturist has to contend with

LOCUSTS AND DROUGHTS—

even the stock-farmer is not entirely immune against these troubles. We may not be able to devise means of preventing the periodic droughts which afflict this country, but we can by consultation bring our combined influence to bear upon the forwarding of irrigation works, the sinking of artesian wells, the construction of storage dams and tapping of rivers with which to provide against the worst. We may not be able to banish all the locusts from the land, any more than we shall ever succeed in entirely doing away with trouble in the world, but we can, by our combined

efforts, insist upon some plan which should commend itself to the various Governments by which these periodic visitations might be considerably minimised. We have it on excellent authority that God helps those who help themselves. Many believe that the locusts are sent by a wise Providence to chasten us. That may be so, but we may as fairly suppose that the particular sins which they are meant to correct are sloth and indifference. In that case the best we can all do is to be up and doing in order to drive the pest from the land. For even though we may not succeed, we shall have the satisfaction of knowing that we have laboured, attempted, and done something, and that in itself is invigorating and strengthening. It is the same with the other questions which will come before you. We are here to discuss them impartially and fully, and though we may not all agree in every detail I trust that our deliberations will be conducted with due consideration for each other's views, and that their results will be sound conclusions which, when presented to those whose opinions we wish to influence, will carry a weight of thought, moderation and sound sense which a due appreciation of the best interests of the country in which we live, claims, and I hope we shall set an example such as we wish our children's children to follow.

"In all that I have said regarding the comparatively satisfactory outlook for the stock-farmer, I have at the same time much sympathy for those at present suffering from that terrible disease, African Coast Fever, and I believe every one here also sympathises with them, and trusts that the deliberations of this Conference will tend to help the sufferers.

"I cannot conclude without a word of thanks for the help and encouragement I have received from the many co-workers. There is one name I must mention, that of your secretary, Mr. MacDermott, to whom I am indebted for a great deal of help cheerfully given, and which must greatly assist this Union. I take it the Colonies and States have not assembled with the set purpose of driving hard bargains or to seize, one from the other, the maximum obtainable, and to give in return the minimum that can be spared. I believe this Conference has met prepared to view South Africa, at least as far as farmers are concerned, as one great farm, jointly occupied by those you represent, the aim being to pool for mutual benefit all your experiences and labours. And, gentlemen, if we approach and discuss all the subjects before us in this spirit—then, and only then, will the amicable settlement and solution of many of our most difficult problems be found. And as the settlement of these questions should develop a still greater amount of that courage and steadfast endurance necessary to stimulate the wise persistence and patient perseverance which is the key to unlock the door to far greater success, I sincerely trust that in this spirit we shall enter upon the great and responsible work of this Conference, which work, I believe, will result in good for yourselves, for those you represent, and for the whole of our dear country."

RAILWAY RATES ON BREEDING STOCK.

Mr. Nicholson moved: "That the Railway Authorities of the South African Colonies be approached with a view to securing a reduction of rates upon all breeding stock, forwarded for breeding purposes only, from one Colony to another." Mr. A. H. Malan seconded.

Mr. F. B. Smith and Mr. Bell asked whether the rate would apply equally to one animal as well as to a number.

Mr. Nicholson said that according to the resolution the number was immaterial. The rates were not merely inter-Colonial, but covered imported stock.

The resolution was carried unanimously.

CARE OF LIVE STOCK ON RAILWAYS.

Mr. Nicholson also moved: "That the Railway Authorities of the various South African Colonies be approached with the view of securing the proper watering and feeding of live stock travelling on their respective lines, and that, where such trains do not already exist, a special live-stock train be run in cases where such action is warranted by the volume of traffic; and that attendants travelling with such stock be allowed a free pass both on the forward and return journey."

This motion was seconded by Mr. Malan and was carried unanimously.

RATES ON PRODUCE FOR EXPORT.

Speaking on the subject of railway rates on produce for export, Mr. Smuts thought that there should be some reduction on the present tariffs. He instanced the fact that he had recently sent wool to Germany, and that the rates from Volksrust to Durban amounted to £4 5s. 4d. for a distance of about 300 miles, while from Durban to Bremen—nearly six thousand miles—the cost was only £9 for the same consignment.

Mr. Nicholson then moved: "That this Conference considers the rates on goods for export are too high to permit of the establishment of an export trade which, in some cases, South Africa is prepared to undertake, and suggests that the various Railway Companies be approached with a view to securing more satisfactory rates."

Mr. Mitchell said that he could send mealies to Durban, from Krugersdorp, at 5s. a ton, and that the produce rate from Charlestown to Durban was 3s. 6d. per short ton.

Mr. Nicholson said that the rate from Krugersdorp was 13s. 4d., and not 5s., per ton.

Mr. A. G. Robertson seconded the motion.

Mr. Scott moved as an amendment the resolution of last year, appearing on page 2 of the agenda, as follows:—"That this Conference is of opinion that it is desirable to obtain a uniform rate for Colonial produce over the various South African systems."

Mr. Mentz said that the districts far removed from ports ought to be more favourably considered—the small profit there was on mealies was swallowed up by the additional rates.

Mr. Hall said that the question of running goods to the coast was very different from running goods inland, as trucks were running down empty.

Mr. A. G. Robertson said that he hoped the gentlemen who lived in the coastal Colonies would meet them. They produced goods and could not find an outlet for them. They merely asked for reduced railway rates, which would enable them to export produce. They wanted to find a foreign market, but the present railway rates were prohibitive. He hoped Mr. Scott's motion would not be accepted.

Mr. Mitchell asked that the question might stand over until the following morning. The Natal Government had done much in this direction for the whole of South Africa.

The President decided that the matter should stand over until next day for the purpose of obtaining further information.

RAILWAY RATES ON AGRICULTURAL MACHINERY, ETC.

Mr. Malan moved, seconded by Mr. A. G. Robertson: "That the rates on agricultural machinery, seeds, fertilizers and fencing materials, should be reduced to the lowest possible paying level, so as to increase the introduction of these necessities of up-to-date agriculture."

Mr. King said that he knew in Natal enormous reductions had been made by the railway in this direction. He hoped that the resolution would be passed.

Mr. Van der Merwe said so far as the Transvaal was concerned the whole question of railway rates could come under discussion before the Customs Commission. He agreed that agricultural implements of all classes should be carried at the lowest possible rate, and was in favour of the resolution before the meeting.

The resolution was carried.

RAILWAY RATES FOR SHOWS.

Mr. Ellenberger (Orange River Colony) moved: "That it is desirable to have a uniform rate for all exhibits and passengers to agricultural shows in South African Colonies, and that the Cape Government railway rates be generally adopted."

Mr. Ellenberger thought that it was highly desirable to have a uniform rate for agricultural shows, which were of so much importance not only to the farming population but to importers of machinery and merchants generally. The Cape rate was the least expensive, and this was the reason why they had thought it advisable to ask for this rate in the resolution.

Mr. Poultney seconded the motion, and said that in spite of all the

efforts they had made they had succeeded in getting anything but an acceptable concession from their Railway Management. They were terribly handicapped. He could not speak too strongly on the question of uniformity of rates in the interests of farmers generally in the Colonies of South Africa.

Mr. J. A. Edmonds suggested the insertion of the words, "and South African Congresses and Conferences," after "Agricultural Shows."

Mr. McDermott thought they had reached the irreducible minimum in the Cape, the rate for passengers to Conferences, etc., being half the single fare.

Mr. Theron said he thought that some difficulty would arise from the fact that many merchants sent machinery to shows merely for advertisement, and not for competition.

Mr. Haarhoff remarked that the various Governments should encourage competitions of agricultural machinery on the land in order that the country generally might derive more benefit from new inventions. Farmers could not accurately judge the value of any machine standing on a show ground. It was necessary that they should see it in working. An implement that worked well in the soil of one district might not suit another.

Mr. Van der Merwe stated that he agreed with Mr. Haarhoff as to the greater importance of showing agricultural implements in working, and suggested the insertion of the words "competitions and trials."

Mr. Van Rooyen also strongly supported the resolution, and stated that nothing had proved more helpful to agriculture in general in Natal than shows and trial demonstrations, where farmers could see the machines in actual working, and were able to judge of their merits.

Mr. Poultney said that merchants and dealers had the right to send their agricultural machinery to the shows as an advertisement or for sale. They could only get the reduced rate if the plough, for instance, was returned to the same station from which it was sent. If the dealer sold the plough he paid full fare.

Mr. Ellenberger amended his resolution, and it was carried, as follows: "That it is desirable to have a uniformly low rate for all exhibits, including agricultural machinery and implements sent to, and if unsold, from, agricultural exhibitions, competitions, or trials, and also for passengers to Agricultural Shows, Conferences, and Congresses in South African Colonies, and that the Cape Government rates be adopted."

CENTRAL SHOW FOR SOUTH AFRICA.

Mr. Robertson moved: "That it is desirable that a Central Agricultural Show for the whole of South Africa be held annually, at which agricultural products, stock, etc., may be entered for competition and champion prizes awarded."

Mr. Van der Merwe strongly advocated the suggestion of a central show.

The Rev. James Scott remarked that if there was to be a central show for South Africa it should be held at different towns in different years.

Mr. Hunt said that he thought the scheme of moving the machinery would be a serious item.

Mr. Edmeades said he thought the show should be laid down on the principles of the Royal Agricultural Show of Great Britain, and that being so it would certainly be an important source of education to this country. There was primarily the question of funds. At the present time shows were largely supported by Governments.

Mr. Poultney said that the Johannesburg Society was of opinion that the time was not ripe for making Johannesburg the Central Show.

Mr. Pott thought Mr. Scott's principle the right one.

Mr. E. W. Evans (Natal) said that for twenty or thirty years the Royal Agricultural Show of England held travelling shows throughout England and Wales, and they were uniformly successful. An experiment was tried to hold the show near London—a show ground was bought at considerable expense, and the show was held there for three or four years. The attendance was miserably inadequate. The Society was almost ruined. People did not attend in sufficient numbers, either from London or the provinces, and in two years they returned to the original system of travelling shows. The attendance in Derby and Lincoln had been ten times as great as in London. He thought the time was ripe for establishing such a show in this country. He thought there was no question as to funds. Durban would take the risk.

Mr. Smith supported the resolution, and said that the show should be held in different places in order to be effective from an educational point of view.

Mr. Van der Byl agreed with the principle of establishing a central show, but he thought it should be left to the Committee of the Inter-Colonial Union to make enquiries if it would be possible to hold such a show.

Mr. Nicholson said the resolution did not bind them down to any place—it only said it was desirable that such a show be held, and he thought everyone was agreed on that point.

The resolution was carried unanimously.

JUDGES AND JUDGING.

Mr. Nicholson moved: "That it is desirable to establish a South African Judges Association with a view to securing the best possible judges, who may, when desired, act in any Colony of South Africa." Mr. Robertson seconded.

Mr. Nicholson said that a meeting had been held in the Orange River Colony at which this subject had been fully discussed, and resolutions drawn up, and it only remained for the Conference to fall into line with what had been done there.

Mr. Halford, as representing the Transvaal Poultry Club, asked Mr. Nicholson whether it was intended to include poultry judges in the proposed Association.

Mr. Nicholson replied in the affirmative.

The President said that the Executive Council would see how far the other Colonies could be brought into line with the Orange River Colony and Natal Judges' Associations.

The resolution was carried unanimously.

Mr. Ellenberger moved, on behalf of the Orange River Colony: "That it is desirable to standardise points of judging at agricultural shows." In moving this resolution, he said that the present system of judging left much to be desired. He thought some standard should be adopted right through South Africa. Take cattle, for instance. In Bloemfontein, a certain bull or heifer would take the first prize, in another place the same animal might not be awarded any prize. A farmer exhibiting in different Colonies should be sure that judging by points would be the same throughout.

Mr. A. H. Malan said the only method by which uniformity could be secured would be by following the recommendations of the South African Stud Book Association. A standard had been drawn up, and he suggested that this should be generally adopted throughout South Africa.

Mr. Struben moved as an amendment: "That the Congress confirms the principle of judging by points, and that the scale of points of the South African Stud Book be adopted." Mr. Nicholson seconded, and Mr. MacMillan also agreed.

Mr. Edmonds, Rhodesia, referring to the practicability of judging by points as far as produce was concerned, said that the only way to encourage the growing of pedigree mealies in their district was to judge by the American system.

Mr. A. G. Robertson said that he hoped the Conference would pass Mr. Struben's resolution. He recognised the difficulties in adopting the point system of judging, but, seeing that the stock of the country was improving generally and coming into closer competition, he thought the advantages of the system would be readily recognised.

Mr. MacDermott explained that judging by points enabled the competitor to know exactly the deficiencies and excellencies of his exhibit.

Mr. Lee said that he would like to see a resolution passed indicating to South Africa that this Union recognises the necessity for training judges competent to allocate these points.

Mr. Struben accepted as an addition to his resolution the words, "and

that where judging by points is adopted at shows, such awards be posted up on the stalls or pens of the exhibits."

Mr. Nicholson agreed.

Mr. Struben further agreed to the insertion of the words "feathered stock"; and his amendment was carried by 40 to 1.

The amended resolution reads: "That this Conference approves the principle of judging by points for all live stock and produce, and recommends that the awards given be posted upon the stalls, pens, or receptacles of the winning exhibits."

Mr. Ellenberger (Orange River Colony) moved: "That the Conference suggests some practical scheme as to judging of agricultural implements at agricultural shows." He said that the present system of judging agricultural implements was very unsatisfactory. The practical farmer could not be expected to judge of the merits of a plough simply by looking at it, and the only fair way to judge of such implements was to put them to the test, so that the farmer could see the actual results.

Mr. Van der Merwe seconded.

Mr. King said that he did not see how it would be possible to hold a practical demonstration of ploughs, harrows, and reaping machines, etc., at many of the shows. They were generally held at the season of the year when machinery could not be used.

Mr. F. B. Smith said that in England the Royal Agricultural Society gave prizes to agricultural implement makers to encourage them to send a collection to the show. They gave prizes for new implements of merit, and they gave one prize a year for tested implements. The impossibility of trying every machine in one year had been recognised by them. They appointed two judges for these trials. One a practical farmer and the other a practical agricultural engineer, who could instruct the farmer as to the technical parts.

Mr. Moon thought the question lay entirely with the agricultural societies themselves. The makers would always be willing to have the implements tried before or after the show.

Mr. Hancock proposed that the system outlined by Mr. F. B. Smith be recommended for adoption by the various Agricultural Societies of South Africa, viz.: "That a prize be given (1) for collections of implements; (2) for new inventions; (3) for practical tests, apart from the show." Mr. Marwick seconded.

Mr. Hannon moved, seconded by Mr. D. M. Brown: "That a small committee be appointed to draft recommendations for the judging of agricultural implements and machinery: Mr. F. B. Smith to be chairman."

On being put to the vote, the resolution and all the amendments were lost,

S.A. COLLEGE OF AGRICULTURE.

Mr. Nicholson moved: "That a Central Agricultural College for the whole of South Africa, supported by all the Colonies, would tend to promote very materially the development of the agricultural industry." Mr. A. G. Robertson seconded.

Mr. Hancock remarked that such a college was already in existence in Natal. Some thirty to forty thousand pounds had been spent in its erection and equipment.

Mr. MacDermott said the Cape Colony had spent more than that for the same purpose.

The Rev. James Scott said that, in view of the fact that Natal and Cape Colony had spent such large sums on Agricultural Colleges, the Conference might pass the principle. A Central College should be established in South Africa.

Mr. MacDermott thought that a sound purpose would be served if some given body could be induced to supply a degree in agriculture, which would form some encouragement to clever young men. If we had an executive body to encourage young men to take more interest in agriculture he thought they would be much nearer the object they had in view than by the actual establishment of a Central College.

Mr. Hannon moved as an amendment: "That, in the opinion of this Conference, an Inter-Colonial Educational Committee should be appointed, with the object of co-ordinating agricultural education and extending systematised methods of experimental research and instruction throughout South Africa." Mr. J. A. Edmonds seconded.

Mr. Nicholson said that he considered this proposition for the establishment of a Central College for agriculture was likely to do more for the federation of the various States of South Africa than anything else put before the meeting so far. He asked them not to adopt a narrow-minded attitude, but to vote for a central South African College.

Mr. Hannon's amendment was lost by 11 votes to 18. Mr. Nicholson's original motion was carried.

OCEAN FREIGHTS ON LIVE STOCK.

Speaking on the subject of ocean freights on the transport of live stock, Mr. MacDermott said that the question had been before the Union and various Colonial Unions for some years, and all had tried to get some reduction on the freight of live stock from England. He then read correspondence on the subject from Messrs. Cooper and Nephew.

The Rev. J. Scott moved the following resolution, seconded by Mr. I. van Alphen: "That this Congress is of opinion that the high rates of ocean freights on live stock seriously hinder the growth of the stock industry in South Africa, and, therefore, urges the Governments of the various Colonies to take the subject into consideration with a view to

bringing pressure to bear on the Shipping Conference for the reduction of rates on pedigree stock to a reasonable level."

Mr. W. A. Edmonds said the most serious aspect of the case was that England was their principal purchasing centre, and they got the best class of cattle from there. It had been pointed out to the Shipping Companies that we should be forced to go to the Argentine and other places for stock, but this would be detrimental to this country.

Mr. Nicholson said that he would like the resolution to be sent to the Board of Agriculture in England, pointing out that Great Britain is losing large sums of money, and that they, more than anyone else, should press the Shipping Companies.

The resolution was carried, with the addition suggested by Mr. Nicholson.

EXPORT RAILWAY RATES.

On resuming the discussion on the question of railway rates on produce for export, Mr. C. H. Mitchell said they in Natal objected to these broad general statements condemning the Railways of South Africa simply because the Central South African Railway was oppressing the Transvaal and Orange River Colony. He thought it was poor gratitude to complain after they, in Natal, had granted all requests made to them. They were already carrying mealies at a loss. If the Transvaal asked their Railway Administration to come into line with Natal he would gladly support them.

Mr. Hall said that they wanted mealies to go down to Natal or Delagoa Bay.

Mr. Mitchell proposed the following amendment: "That the Central South African Railways be approached to reduce their railway rates in accordance with the coastal railway rates."

Mr. Nicholson said that the argument advanced yesterday by Mr. Mitchell was to the effect that they could send mealies from Krugersdorp to Durban at a rate of about 5s. per ton, but that was really not half of what they had to pay from Krugersdorp. He had disputed the fact, and laid circular proof on the table showing that his statement had been correct. With regard to the rates from Charlestown he had nothing whatever to do. From Volksrust the rate was 13s. 4d. per ton to Durban. If between Charlestown and Volksrust—a distance of two miles—the Natal Railway were so generous to their farmers as to make a reduction of 8s. 4d., then he thought that the Natal delegates had every reason to be satisfied. He was not talking about Natal but the actual facts in the Transvaal, and maintained that the rates being charged were too high to admit of the establishment of that export trade which certain portions of South Africa were prepared to undertake providing that they could get suitable rates. Farmers in the Transvaal had to pay exceedingly high wages, high prices

for land, and, in addition, railway rates which were crippling them considerably.

On the amendment being put to the vote, it was declared to be lost.

Mr. Nicholson's original resolution was declared carried. A division being called for by Mr. Mitchell, the voting being by Colonies, Mr. Mitchell's amendment was carried by 20 votes to 11.

INTER-COLONIAL SCAB REGULATIONS.

Mr. Ellenberger moved, on behalf of the Orange River Colony: "That it is desirable that the law for the eradication of scab in sheep and goats should be made an Inter-Colonial South African question and should be uniform throughout South Africa."

He said the Orange River Colony had a very stringent Scab Law, which had been productive of excellent results. He understood that in the Transvaal there was no law for enforcing any penalties, but it was absolutely necessary in order to cope with and stamp out these diseases. The matter was in the hand of the Veterinary Surgeons themselves. As in the case of the destruction of locusts, it was useless for one Colony to have stringent rules if the neighbouring Colonies took but little interest in the subject. General Smuts had said quality as well as quantity was an important feature in the export wool trade of South Africa, and it was only by united efforts for the eradication of this disease that a good quality of wool would be obtained.

Mr. Scott seconded the resolution.

Mr. T. Smuts agreed that the question was a most important one for the stock-farmer, but could not see that it was necessary to frame a uniform law for the whole of South Africa. Their experience had taught them that the framing of Scab Laws was fraught with excessive difficulty. No Colony in South Africa had a Scab Law which gave general satisfaction. How could they hope to frame one which would be satisfactory not only to one, but to all the Colonies. Each Colony should frame its own law, but the regulations should not impose unnecessary hardships on those residing in adjoining Colonies.

He moved: "That the framing of regulations relating to scab would be left to the various Colonies concerned." Mr. Struben seconded.

Mr. Gray submitted that there were regulations in the Transvaal which were conscientiously enforced. He endorsed all Mr. Ellenberger had said with regard to uniformity in Scab Regulations.

Mr. Theron moved an amendment to the effect that the resolution read as follows: "That it is desirable that the eradication of scab in sheep and goats should be made an Inter-Colonial South African question."

He suggested that delegates be appointed from all the Colonies to meet on a common basis to carry the eradication of scab into effect.

Mr. Granville Nicholson seconded, and remarked that he thought that a uniform law would be impossible.

Mr. Struben moved a resolution advocating general compulsory dipping throughout the whole of South Africa. Mr. Cloette had said that dipping spoiled the wool, but he would rather have a small loss at the time than endure the scourge of scab.

Mr. King, in supporting, said his only reason for not supporting the original amendment was that he feared there would be some relaxation on the part of the Orange River Colony. So far as Natal was concerned the other Colonies were a constant menace to them. The precautions were severe but not sufficiently severe. He denied that dipping deteriorated the wool. He obtained the highest price he ever had for wool which had been dipped three times. Australia, New Zealand and Tasmania had succeeded in clearing their flocks of scab by this process, and they counted thousands of sheep to South Africa's hundreds.

Mr. Douglass said that the Acts could not be too stringent.

Mr. A. G. Robertson (President of the Transvaal Agricultural Union) said that in the Transvaal they had adopted a system of compulsory dipping, but unless they carried the farmers with them and made the Scab Law popular it would be impossible to carry it out successfully. They were making tremendous headway in the Transvaal. The leading farmers were recognising that it was possible to eradicate scab and clamoured for the law to be made more stringent, but until the majority of sheep farmers all over the country could be brought into line they could not make an ideal uniform Scab Law for South Africa. He begged to move the following resolution: "That this Conference suggests that the various South African Governments be approached with the view to the appointment of an Inter-Colonial Commission for the purpose of framing Scab Laws, which shall be as far as possible on the same lines and uniformly stringent in each Colony."

Mr. Nicholson, in seconding, said that he recognised that the laws should be as stringent as possible, but to be successful, they must study the conditions and carry the people along with them.

Mr. Hancock supported the original resolution. He said that he thought that an expert should go round advising the farmers. Scab was one of the most easily cured diseases. The difficulty lay in the application of the remedies.

Mr. W. A. Edmonds supported Mr. Theron's amendment. He said he could see no prospect of framing a law to suit all the Colonies.

Mr. Ellenberger, replying, said that the Congress was apparently agreed that scab must be eradicated, but they were not at one on the question of compulsion. He feared that unless compulsion was used scab would never be eradicated. He was fully aware that conditions varied in different parts of South Africa, but arrangements might be made to suit

each Colony. A uniform law would do away with many difficulties. It should apply to the whole population—whites, as well as natives.

Mr. Struben withdrew his amendment.

The original motion and Mr. Theron's amendment were lost, and Mr. Robertson's amendment was carried.

EAST COAST FEVER.

Mr. Lee explained that he had found it necessary to allow only half an hour for the discussion of this question.

The motion on the Agenda, and submitted by the Orange River Colony, read as follows: "As East Coast Fever is still prevalent it is desirable that the restrictions in force should not be relaxed."

Mr. Scott said that he did not consider the resolution strong enough. He moved: "As East Coast Fever is still spreading it is desirable that all the Governments of South Africa unite in taking more active measures for its eradication."

He warned the Congress that if they did not assist in the movement to stamp out this insidious disease they would soon have it among their cattle and lose millions of pounds thereby. In Natal the Government took possession of the cattle whenever the disease occurred, destroyed the diseased cattle, sent the in-contact cattle away, and paid the owners something like half the value. The infected territory was fenced in, and no cattle allowed into it for some two years. The regulations, in his opinion, could not be too stringent.

Mr. A. H. Malan then rose to support Mr. Scott's resolution. They had ample proof in the Transvaal, he said, that the disease could be eradicated. Four years ago at the first meeting of this Conference in Pretoria, they had brought forward a similar recommendation which unfortunately was not accepted. Nevertheless it was not too late to save the remaining part of South Africa which had been kept clear. They should impress the necessity upon their different Governments of the most stringent regulations being formulated to stamp out the disease.

Mr. Struben said that he did not share Mr. Scott's views with regard to the methods adopted in Natal for stamping out the disease. People were moving cattle up to the Transvaal border every day. The infection must necessarily spread into the clean areas.

Mr. Van Rooyen said that he did not think that any measures taken in his district would ever be considered too stringent. They had had the disease two years. The measures taken by the Government had been successful so far as keeping the disease within a certain area was concerned, but he agreed with Mr. Struben that there must also be individual effort.

Mr. Lee asked Dr. Theiler if he could throw any light on the subject.

Dr. Theiler reminded the Congress that at a meeting of the Inter-

Colonial Veterinary Conference held some years ago in Capetown they had recommended that all the Colonies should combine to eradicate the disease by destroying all cattle in an infected area. The same proposition came before a Conference shortly afterwards in Pretoria—there was some opposition, but it was finally carried. The Government did not act on the suggestion at the time, but if the other Colonies came to them offering to help to eradicate the disease by killing cattle on their infected areas they would find the Transvaal ready to-day. In the Transvaal, apart from Zoutpansberg, the disease was reduced to a few herds, and it would take a comparatively small sum of money to get these few outbreaks stamped out.

Mr. Scott's amendment was carried.

PURCHASE OF LAND BY NATIVES.

Mr. Lee reminded the Congress that this question was a difficult one—it must be discussed from an agricultural point of view, as the Union refused to enter into party politics. Fifteen minutes would be allowed.

Mr. W. A. Edmonds moved: "This Conference is strongly of opinion that the permanent prosperity of South Africa is intimately associated with the question of land tenure by natives; and would urge upon the Governments of the various States of South Africa the vital importance of this question, and therefore asks that the subject be taken into early consideration by all South African Governments with a view to such measures being initiated as will ultimately lead to its final settlement and promote the agricultural development of South Africa."

He said the question before the Conference was of vital importance. Since the census of thirteen years ago, in the Eastern Province of the Cape Colony, the native population had more than doubled—some 160,000 acres of land in this district had passed into native hands. The native was notoriously a careless farmer and the country was filled with contagious diseases. The Government had seen that this was a great subject, and a Commission was investigating. There were many cases in his district of a 30 per cent. rent upon the full divisional valuation of farms, being charged per annum to the native, and there were actually syndicates being formed by men to buy farms and sell them to natives. The moral fibre of the white man was being weakened, and it meant degeneration. The question was a vital one—it must be shirked no longer.

Mr. Hancock, in seconding, said that it was the most important resolution yet put forward. The Colonial Secretary had yesterday fired their imagination by describing a united South Africa. This question above all required united action. Until the native question was settled South Africa would never make the progress it should do. When the white man prospered the native prospered and *vice versa*. He did not mean that the line of demarcation should be broken down, but they must realise

their responsibilities. The native was a fact, and they could not explain him away. He was with them for all time. He thought their interests were best served by promoting the interests of the whole community. It was the farmers who realised the gravity of the situation. He would not indicate the lines upon which legislation should take place. There was abundance of evidence from the various Commissions, and he urged the Governments to take it up as a question of practical politics, because the position was daily becoming more serious.

The Rev. J. Scott said that he had spent most of his life among natives, and in the interests of the natives he supported the resolution, and he desired to second the motion.

Responding to an enquiry by the Chairman for any amendment, Mr. Mentz moved: "That this Conference is of opinion that all the Governments of the South African Colonies should pass laws prohibiting the sale and transfer of fixed property to natives and those not of European descent." This was seconded by Mr. Rousseau.

Mr. Smuts moved, as an alternative amendment, seconded by Mr. Van Alphen: "That the question stand over for another year to give an opportunity for the various affiliated unions to consider the point and to lay their views before the next meeting of the Inter-Colonial Conference."

Mr. Smuts said the question was admittedly a serious one not only to them but to the generations to come. His object in putting the resolution was to gain time to think the matter over. A question of life and death could not be decided in a few minutes. Next year they would be able to present to the Government a thoroughly-thrashed-out resolution.

This amendment was lost.

Mr. Mentz said that he moved his amendment as he did not consider the original one went far enough. They expected the Government to debar the native from holding ground. They approached this matter from an agricultural point of view, not from that of politics. The object of locations was to confine the natives to certain parts.

Mr. Theron said there were 2,600,000 natives in their Colonies to deal with. The ground had been given to the natives many years ago in his Colony. They paid revenue to the country. They were educating their children. He thought that if a native had bought a farm and paid for it no law could deprive him of it. The man who sold the farm was to blame. He thought the Government in his Colony had been successful in keeping the native in his place, and he would vote for the original resolution.

Mr. Hall said that there was nothing to suggest that native lands should be expropriated.

Mr. Edmonds' original motion was carried.

LOCUST DESTRUCTION.

Mr. Poultney moved: "That it be a recommendation to the various Governments of South Africa here represented to frame a uniform compulsory law for the eradication of locusts." Mr. Nicholson seconded.

Mr. Pott said he would like to add to the resolution that the law should cover the right to commandeer natives within the area where compulsory action was to be taken, and pay them for it. It was only fair that all the Colonies should subscribe to the work, as whether it was carried out in the Kalahari or the Cape the other countries would benefit.

Mr. Fuller said that, as the Rev. Mr. Scott had already told them, in Natal they had a law providing for the compulsory destruction of locusts. On three separate occasions they had had to amend that legislation, and the present Act was not perfect. If the other Colonies were going in for compulsory legislation, it was not the native that would be so much affected thereby but the European. The people themselves must take the matter up. The principle adopted in Natal was this: The Government undertook the destruction of locusts in native locations, and called upon the farmers to destroy the locusts on their lands. This destruction of locusts by the arsenical solution had been done under his (the speaker's) supervision for the past five or six years. The prosecutions under the law had been very few. It was very hard for the farmer affected to be compelled to destroy the pest wholly at his own cost. In destroying he was working for the good of the Colony in general. Mr. Fuller therefore thought that the farmer should be helped in his work by the State. If they decided on having compulsory legislation, then let the State provide the materials. Nothing but combined action would be effective. Compulsory legislation was absolutely necessary to get at those people who would do nothing.

Mr. Hunt proposed, and Mr. Van Alphen seconded: "That it be a recommendation from this Conference to the various Governments of South Africa that the most vigorous, and as far as possible united, action be taken by them to destroy locusts, and, further, that in the opinion of this Conference it should be made compulsory for occupiers and owners of land to render all reasonable facilities to the officials appointed to carry out these duties."

Mr. Pott, seconded by Mr. Malan, moved: "That the various Colonies be asked to adopt the principle of a central fund for the destruction of locusts, and that the Government take charge of the measures for such destruction, having the right to commandeer natives, upon payment, to assist in the work."

Mr. MacMillan moved, seconded by Mr. Rousseau: "That an Inter-Colonial Board for locust destruction be appointed, and that the Colonies be asked to vote a sum of money—not less than £50,000—for such destruction."

Mr. Edmonds informed the Conference that Rhodesia had set aside between four and five thousand for taking up the matter.

Mr. Lounsbury said the Cape had set aside £5,000. Basutoland and Bechuanaland were also taking action, so that without compulsory legislation or a Colonial Board practically the whole of South Africa was moving in the matter.

Mr. R. G. Nicholson said that the Transvaal had set aside £10,000, which was still better, considering the depression in the Transvaal. It was apparent that they were all agreed that locusts must be exterminated. The principal point was that it should be compulsory. In the Transvaal they had big land companies, and they could not compel them to extend the destruction of locusts to their lands.

The original motion was carried.

PLANT DISEASES.

The Secretary drew the attention of the Conference to the fact that a resolution on the subject was carried at the last meeting of the Union, viz.: "That the various Governments be approached with a view to introducing legislation to compel owners of fruit trees and vines to take proper measures to keep them free from insects and other infectious pests, and that a suitable penalty be fixed for the violation thereof."

Mr. King moved: "That last year's resolution be reaffirmed and forwarded to our respective Governments."

Mr. Fuller remarked that the question was in the hands of the Government Entomologists.

Mr. C. P. Lounsbury, on being asked for information, said that a meeting of the Entomologists of the various Colonies had been held at the Cape. They had drafted regulations and secured the support of the various Governments who were administering these regulations to the best of their ability. They were helping each other, and nothing could be gained by asking more just now.

Mr. Krige suggested the various Governments be requested not to relax already existing laws.

Mr. Mitchell thought the penalty imposed upon infected fruit, and fruit trees from nurseries was insufficient. There was no means of getting at the people who sold the infected trees.

Mr. Smith said he wished to advocate two points with reference to the resolution: More people to go into research in respect to the different diseases of plants in South Africa, and more instruction thereon. A great many consignments received lately from Natal had been infected with scale and other diseases.

The resolution was reaffirmed.

UNIFORM WEIGHTS AND MEASURES.

Mr. MacDermott read the correspondence from the Natal Minister of Agriculture on this subject.

Mr. Hunt pointed out that in Johannesburg the alteration to which the correspondence referred had been made. The Transvaal Farmers' Association, of which he was secretary, had agreed, and it was in the by-laws of the Council.

Mr. H. H. Hards moved: "That this Conference is of opinion that the time has arrived when weights and measures should be made uniform throughout all the Colonies of South Africa, and that the different Governments be approached to have this carried into effect by legislative enactment."

He added that farmers must be agreed that the variation in weights and measures in the different Colonies was annoying and hampering the trade.

Mr. Scott supported the motion, and said that the question was of great consequence.

Mr. Hancock pointed out that at the meeting of the Union held in Capetown last year this matter was fully discussed and a resolution adopted (page 15, *Inter-Colonial Union Report, 1906*). He thought they could not do better than follow this up. He did not think the Executive had carried out the instructions of the resolution.

Mr. Van der Byl supported Mr. Hard's resolution. The present system caused much inconvenience and often loss, and opened the door to rascality.

Mr. Hancock moved the readoption of last year's resolution.

Mr. Nicholson seconded.

Mr. MacDermott said there had been some difficulty in getting a full meeting of the Executive, and it was accordingly decided to let the question stand over for the time being—that was the reason why last year's resolution had not been acted upon.

Mr. Hancock's amendment was lost, and the original resolution moved by Mr. Hards was carried.

Mr. Nicholson referred to the prospects of the Matolla Fibre Planting Syndicate, Limited, which had been handed to him for the information of delegates.

DUTY ON FRUIT-BOX WOOD, ETC.

Mr. Van der Byl moved the following resolution: "Seeing the importance of the fruit and allied trades in the different Colonies, and seeing that Colonial wood suitable for making fruit boxes is practically unprocurable, it is in the opinion of this Congress highly desirable that the duty at present being levied on such wood and upon packing material should be removed until such time as Colonial wood is procurable."

Mr. H. H. Hards, in seconding, said that so far as Cape Colony was

concerned it was impossible for them to take up the matter without the consent of the Customs Convention. The packing material in many cases amounted to 15 per cent. of the total cost of the goods. This was admittedly too high and constituted a serious hindrance to the trade.

Mr. Nicholson said a resolution had been passed by the Transvaal Agricultural Union to the same effect. The Transvaal suffered in the same way. Tissue paper was also subjected to a duty. The fruit-growing industry of the Transvaal was greatly hampered thereby.

A letter on the subject from the Fruit Exporters' Association of South Africa was read. The resolution was carried unanimously.

THE SHIPPING RING.

The Rev. J. Scott, seconded by Mr. I. van Alphen, moved: "This Union considers that the agricultural development of South Africa has been retarded by the formation of the Shipping Ring which now dominates South African trade. The system of 'deferred rebates' is used to maintain a monopoly in freights on a higher level than would be the case were there an open freight market. Therefore this Union trusts that the several Governments of South Africa, acting in conjunction with the Imperial Government, will take steps to make 'deferred rebates' or any similar device illegal, and thus restore a beneficial competition in the carrying trade between Great Britain and South Africa."

He added that a Commission was at present sitting on this subject, and he was sorry to say neither the Government or merchants of South Africa had taken up the position we had a right to expect. Some of the merchants he feared were interested in the Shipping Ring, and old-established houses with large connections did not care what the rates were—they put on their profits—it was the consumer who had to pay. Some strenuous effort should be made to break up this iniquitous Shipping Ring.

Mr. Van Alphen said that the Transvaal Government had this matter seriously in hand, and the Chambers of Commerce were working to obtain evidence as to what really was wanted in order to place it before the Commission.

Mr. King, referring to the question of rebates, told the Conference that this system had been adjudged as illegal in the United States. The Shipping Ring at present allowed ten per cent., but if a merchant made a single shipment by any other line he forfeited the rebate for a year—a great many people never claimed this rebate, and on the other hand the agent often took it instead of the consignee.

The resolution was carried unanimously, with the rider: "That this resolution be forwarded to the Imperial Government, the Secretary of the Royal Commission now sitting, and to the several Governments of South Africa."

Mr. King further moved: "That the Executive Committee of this

Union be represented at the coming meeting of the Customs Union Conference to give evidence and watch the interests of the community they represent."

Mr. Lee objected to the motion as being out of order, and suggested a modification to the effect that the Executive Committee be empowered to send a representative if they considered it desirable, and this was carried without objection.

GOVERNMENT LIVE STOCK AT SHOWS.

Mr. Poultney next moved, seconded by Mr. A. G. Robertson: "That in the opinion of this Congress it is desirable that the Governments of the different Colonies here represented shall compete with their live stock at central shows, while not taking any prizes."

It would be very good from a competitive point of view, he thought, if the Governments took their fine stock to the various shows. The suggestion had been objected to as being unfair to the private individual, but the argument failed inasmuch as there was no reason why the private individual should not compete against the Government as well as against wealthy men like Sir George Farrar and Abe Bailey. The Government would not take the prizes, but would simply ascertain whether the stock they imported for stud purposes in South Africa was the finest that could be obtained. It would act in the interest of agriculture generally if the vote were unanimous—the Government would take care they were not beaten.

The resolution was carried unanimously.

RETURN EMPTIES.

In the absence of Mr. Granville Nicholson (the original mover), Mr. Mitchell moved the following resolution, seconded by Mr. Moon: "That in the interests of the fruit-growing industry of South Africa this Conference considers that the principle of free return empties should be adopted and established throughout the whole of the South African Colonies."

Mr. Mitchell said Natal was greatly ahead in its system of returning empties promptly and economically. He thought the other Colonies would do well to follow their example.

Mr. Hards and Mr. Lounsbury objected to the return of empties to fruit-growers on the score that many diseases and pests were spread by this means.

Mr. Van der Byl said the system in vogue with the Cape Government Railways was the best. Any consignee, unless he marked his empties "Not to be returned," paid 10 per cent. in addition to the ordinary railway charge. The Entomologist Department was dealing with the question of fumigating empties.

Mr. Fuller said the danger in returned empties did not emanate from the farms from which the goods came, but from the other empties with which they came in contact en route. The goods got contaminated whilst lying all packed together at the market—the codling moth larvae passed from one case to another.

The resolution was carried.

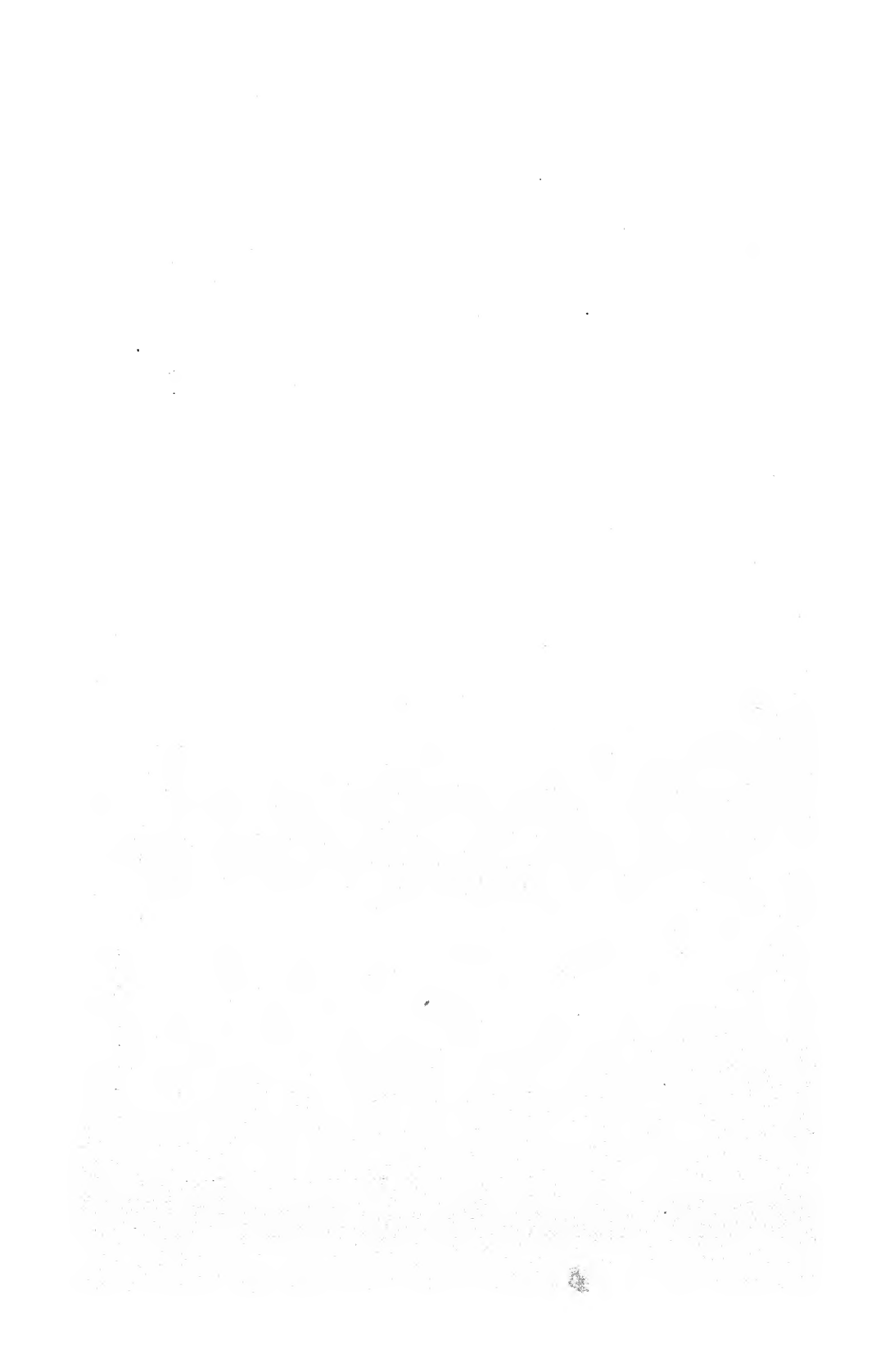
ELECTION OF OFFICERS.

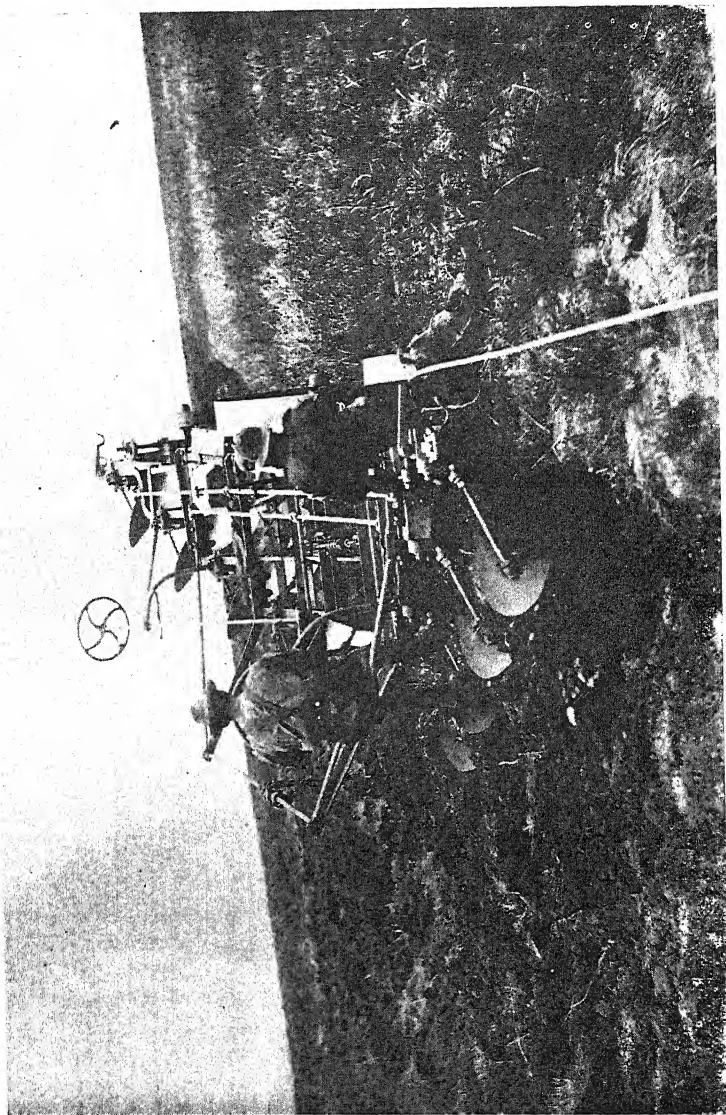
Mr. C. G. Lee was re-elected President, the Hon. P. W. Michau and Gen. T. Smuts Vice-Presidents, Mr. F. T. Nicholson (Box 134, Pretoria), Secretary, and Mr. D. M. Brown Auditor.

NEXT PLACE OF MEETING.

Invitations were extended from Natal and the Orange River Colony. The President favoured going to Bloemfontein, as they wanted to get into closer touch with the O.R.C., but if they did not affiliate they should accept the Natal invitation.—This was agreed to.

During the ten months ended 31st October, 1907, merchandise to the value of £21,895,009 was imported into British South Africa, as compared with £25,402,975 for the same period of last year. In addition there were imported “articles for Colonial Governments” to the value of £1,293,172 in 1907, compared with £1,394,445 in 1906, and specie amounting to £651,889 in 1907 and £580,292 in 1906; bringing the grand total of imports into British South Africa to £23,840,070 in value in 1907, as compared with £27,377,712 in 1906. During the same period South African produce to the value of £39,229,751 was exported in 1907, and £34,646,394 in 1906. These figures do not include goods of South African origin exported through the medium of the parcels post, as it is not possible at present to distinguish between the values of the S.A.P. and goods not S.A.P. which are exported by this means. Goods to the total value of £42,854 were exported through the parcels post in 1907, compared with £30,685 in 1906. Re-exports valued £502,734 this year and £515,360 last year; and specie amounting to £123,709 was sent out of the country this year as compared with £659,449 in 1906. The grand total of exports from British South Africa during the ten months thus amounted in value to £39,899,048 in 1907, as compared with £35,851,888 in 1906.





STEAM CULTIVATION AT MOUNT EDGECOMBE.

The plough has just been started on a new set of furrows. The engine which is hauling it is over the brow of the hill, the sky-line of which is seen in the distance.

The Mechanical Cultivation of the Soil.

APPLICATION OF STEAM POWER.

ADVANTAGES OF DEEP TILLAGE.

IMPORTANCE OF DEEP PLOUGHING.—REPLACING OF ANIMAL BY STEAM POWER.—DEVELOPMENT OF STEAM CULTIVATION.—SYSTEMS IN USE.
—STEAM PLOUGHING IN NATAL.—ADVANTAGES AND DISADVANTAGES.
—CO-OPERATIVE PURCHASE ASSOCIATIONS.

A PRETTY story is recounted of a dying vine-dresser who told his sons of certain treasure hidden in the vineyard, which they would discover after his death. The sons after a thorough search failed to find the jar of gold that they had expected, and were consequently sorely disappointed. But the treasure was there, nevertheless; and the fact dawned upon them when they found that the yield of the vineyard was doubling itself. The vine-dresser had realised that the nourishment absorbed by the roots of plants can be considerably increased and the yield correspondingly enhanced by deeper cultivation; he understood, in fact, the principle of the adage that "well ploughed is half manured."

The treasure that the vine-dresser set his sons to seek is a treasure that lies in all our fields; generally we manage to extract a little of it, but there is much left of which we may avail ourselves if we will go to the requisite trouble. And the "Open, Sesame" in response to which nature will render unto us portion of these latent stores of wealth is *Deep Ploughing*—deep ploughing efficiently performed.

THE IMPORTANCE OF DEEP TILLAGE.

The proper preparation of the soil is one of the first essentials in the successful growing of crops. Experience has conducted the husbandmen of every age to the knowledge that the soil must be stirred, and its parts divided and comminuted, before it will yield its fruits to human labour. The same wants have, indeed, almost everywhere led to similar measures for arriving at the ends proposed. The instruments of tillage of the early ages are yet in use in many countries. The plough, the harrow, the hoe, and the sickle, of the ancient labourers of Egypt were the same as those employed on the banks of the Ganges at the present day; and all over the East, from Aleppo to the Sea of Japan, the implements of tillage of the early ages are yet those of the people. The plough of the Greeks and Romans was similar to that of the inhabitants of Syria at the pre-

sent time; and from Scandinavia to the Atlas Mountains the form of this, as of all the other simpler tools of the husbandmen, was so much alike that they almost seem to have been fashioned from the same common model.

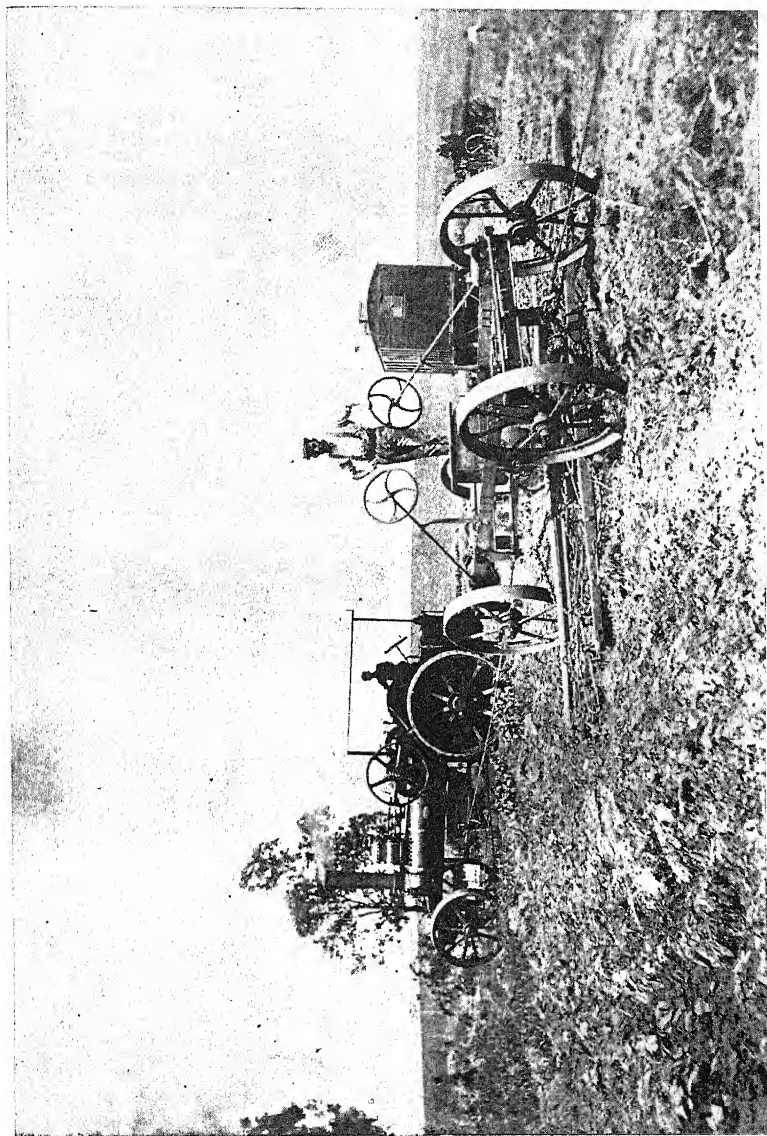
The history of the cultivation of the soil, the evolution of which always goes hand in hand with the development of other spheres of human activity, shows us the treatment of the ground from the most primitive beginnings of the cultivation of the soil, progressing from the mere scratching of the surface to the introduction of deep cultivation, when manual labour was superseded by animals, and, later, animals by steam power.

The soil must afford the plants a firm hold, thus at the same time extending the area from which the roots are able to draw their food supplies; it must easily absorb moisture and afford the most even degree of moisture possible; and it must admit easy access of air and warmth. That deep ploughing fulfils these requirements has gradually come to be recognised, for, in the first place, owing to the roots being able to branch out more easily in all directions, especially downward, the plants secure a firm hold and food supplies are at the same time rendered available to a much greater extent than under ordinary conditions. The productive stratum is increased by deep culture. The oxygen of the air, circulating in the loosened layers of earth, exerts a very beneficial influence; the remains of former crops and also the manure assimilate more quickly to loam, this in its turn resolving itself into water and carbonic acid. The deeply worked soil is more susceptible to warmth than that loosened on the surface only. Also, in the very wet weather the surplus water, which would be injurious on the surface, percolates through the deeply loosened soil to the lower layers, without interfering with the growth of the crop; whilst in land not so deeply broken the soil becomes water-logged and swampy and so roots and plants are soon destroyed. On the other hand, if there is a long drought the land deeply ploughed forms a

NATURAL RESERVOIR OF MOISTURE.

which, by the capillarity of the soil under the action of the sun, rises to the surface and maintains a dampness beneficial to the roots of the crop. In land not so deeply worked the moisture is quickly exhausted and the land becomes parched, thus causing a stoppage in the vegetation and consequent failure of the crop. In a well-worked soil, furthermore, the subsequent operations become easier, and can consequently be done more quickly and more cheaply. It is certain, for example, that ridging, digging or hoeing will be more easily done in land deeply ploughed than in land which has only been ploughed on the surface, the former being softer and less resistant to the hoe.

To sum up: experience shows that the soil must be tilled to a considerable depth beneath the surface. This allows the roots of plants to



STEAM CULTIVATION AT MOUNT EDGECOMBE.

A view of the harrow.

extend themselves in the earth and derive their nourishment from a larger mass of soil. It removes the water which collects between the soil and subsoil to a greater distance from the roots of plants, without, however, depriving the soil of water; for it is found that a deeply tilled soil remains more moist, even in the heat of summer, than one that is shallow. It is on this principle that the so-called dry-farming is based: The subsoil acts as a reservoir: the rain, instead of remaining in the surface soil, sinks down to the subsoil, which thus remains moist; and the moisture which the subsoil so holds ascends once more to the upper portions of the soil when the latter is sufficiently dry to furnish ideal conditions for capillary movement. Tillage of any kind, and deep tillage in particular, admits air into the soil, which is necessary for the proper development of the plant; and a due degree of warmth is also maintained in the soil.

CULTIVATION BY STEAM.

These are some of the advantages of deep cultivation; but it is apparent that we cannot get the best results by the use of animal power, for a depth of, say, fourteen inches cannot be attained quickly and cheaply with animals, and ploughing to a depth of twenty or thirty inches cannot be seriously thought of. For such work traction by steam power is indispensable.

ADVANTAGES OF STEAM PLOUGHING.

It is hardly necessary to point out that the work of the steam plough is, in respect to depth and evenness of depth, far more efficient than can be accomplished by the best implements without the aid of steam. Hard and tough soil, stony ground and the like, often necessitate raising the best of our ploughs worked by animal power—in other words, making uneven and defective work. The steam plough, on the other hand, owing to its great weight, runs firmly and surely through the soil, at an even depth, developing hitherto untouched treasures slumbering like so much invested capital in the lower strata, and devoting them to the service of agriculture. The conditions of temperature and moisture of the soil are, furthermore, profitably regulated; and drainage becomes really effectual by the opening of the subsoil.

In heavy and cut up kinds of soil, faultless and deep ploughing can be accomplished more cheaply than by animal power. The absence of footprints left by the animals is, especially on heavy soils, of very great importance. When we consider that, especially in harrowing, not a square foot of ploughed ground is untouched by repeated stamping from the hoofs of horses and oxen, it is indeed a wonder how vegetation can properly flourish on ground kneaded in this way.

The effect of deep ploughing on the various kinds of plant life varies considerably; and it does not depend alone upon the depth but also very much upon the way the work is done. Owing to the more rapid propulsion

of the ploughing tackle, in working with steam power, the effect produced is more intense and more energetic than that produced by machines hauled by animal power. Working with the steam plough is also far less dependent upon the weather than working with animals, so that work can be done with the steam plough when the same kind of work done with the aid of animals would be impossible.

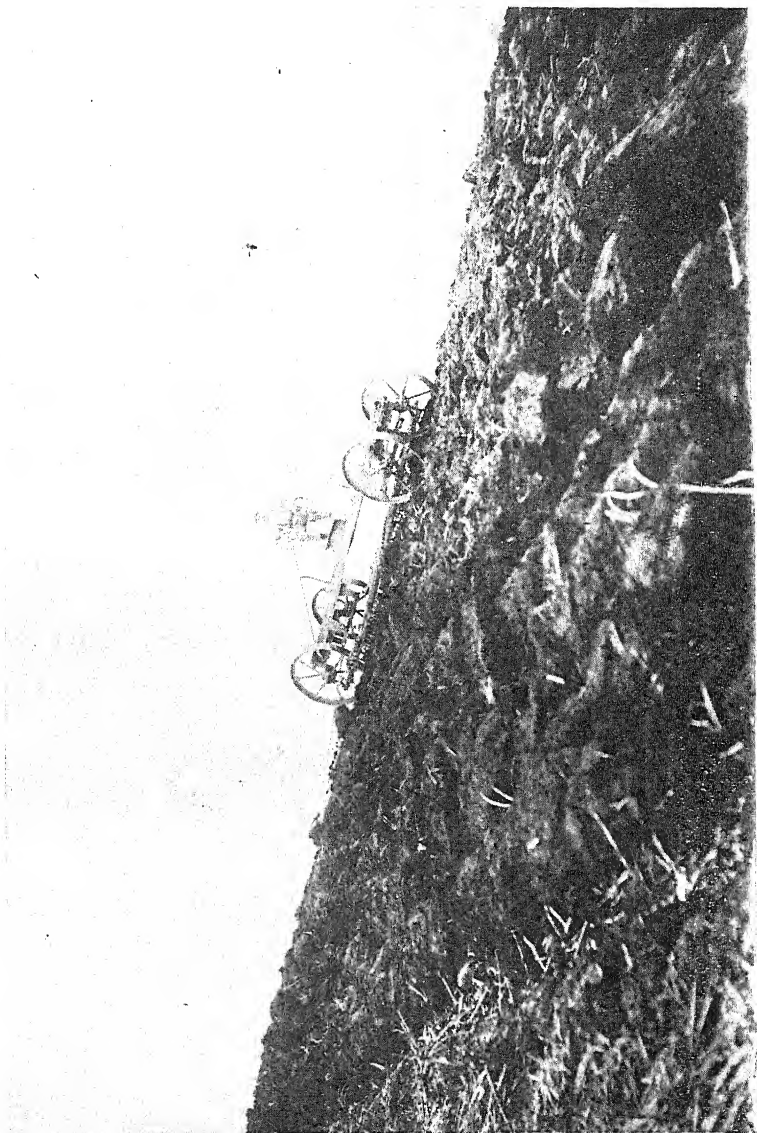
When steam cultivation is first employed it is not always advisable to go to a depth of 12 inches to 14 inches at once. In many cases the results might be different from those anticipated. If ordinary ploughing has been done to a depth of, say, 5 inches to 6 inches, it is advisable, when steam is employed, to increase the depth gradually in order that too much soil which has never been exposed to the air and sun may not be brought to the surface. By ploughing a little deeper at each subsequent operation, a new layer of soil, which may be called virgin, is mixed with the old soil and regenerates it; at the same time the soil becomes aerated and azoted, and in two or three ploughings a layer of productive mellow land 12 or 14 inches deep is obtained, in which roots can penetrate and spread.

An important advantage of steam cultivation which may be mentioned is the complete annihilation of weeds. The benefit of this cannot be expressed in figures, but all practical agriculturists will see at once that by the destruction of weeds the crop plants not only gain space to develop but also get nutritive matter which would otherwise have been absorbed by the weeds.

THE INTRODUCTION OF STEAM POWER.

HISTORICAL.

It was not surprising that, after the invention of the steam engine, the advocates of deep culture should become possessed with the idea of making use of the more effective, cheaper, and untiring steam-power in preference to animal power for the deeper cultivation of their fields; especially as certain enthusiastic persons in England had, even before the discovery of steam-power, applied for patents for appliances by means of which the ground could be worked without resort to animal power. James Watt, the inventor of the steam engine, announced to the Patent Office in 1780 his intention of utilising steam for the cultivation of the land, although later he gave the matter up. Others, like Romaine, Usher, Comstock, however, pursued the idea and proceeded to construct machines for the purpose of propelling implements for the cultivation of the soil. But their inventions met with little favour at the hands of the public, sharing the same fate as those of other enthusiastic engineers. Not until the year 1855 did the engineers, John Fowler, of Leeds, and James Howard, of Bedford—and that, too, almost at the same time,—succeed in constructing steam ploughs for practical use. Both machines naturally showed



STEAM CULTIVATION AT MOUNT EDGECOMBE.

Another view of the harrow. Some idea of the slope of the ground may be gained from observing the angle of the steel cable on the right.



many imperfections, but inventions and improvements followed—such as Fiskien's balance-plough, Burton's clip-drum, and Fowler's travelling anchor, which three inventions formed the beginnings of the anchor system. Smith, of Woolston, and Howard, of Bedford, invented a second system by uniting a common locomotive with a drum windlass apparatus mounted on two wheels, the field to be cultivated being completely encircled by a wire rope proceeding from the apparatus. This system, however, also showed many imperfections; and it was not until the year 1863, when John Fowler adopted the two-machine system invented by Savory, that steam-cultivation was placed on a firm basis—a basis on which it has since continued to develop.

Fowler's apparatus first proved their good qualities in Egypt, where both the Viceroy and his cousin, Halim Pascha, laid out extensive cotton plantations. In Germany the system made its debut at the exhibition of the Pommersche Oekonomische Gesellschaft at Stettin, and was also displayed at the International Agricultural Exhibition at Cologne in 1865. It also, about the same time, obtained a firm footing in the Province of Saxony. In the following years agriculturists and beet sugar manufacturers in the neighbourhood of Halberstadt had ample opportunity for forming an opinion of the advantages of deep ploughing by means of steam power, as Herr Geheimrath Eyth, the founder and director of the German Agricultural Society, arrived at Wegersleben in September, 1869, with a 14-h.p. two-engine system and implements specially constructed for the cultivation of beet sugar, and from this point ploughed more than a thousand acres in Anderbeck, Mahndorf, Hoym and other places. Since then the cultivation of the soil by steam power has steadily gained ground, and tackles are now in use in England, France, Germany, Austria, Hungary, Russia, Roumania, Bulgaria, Italy, Northern Africa, United States of America, West Indies, Argentina, Australia and many other countries.

THE SYSTEMS DESCRIBED.

The agriculturist wishing to become the owner of a steam ploughing apparatus has the choice of two main systems: the cable system and the direct traction system. The cable system, again, may be subdivided into—

- (a) The double-engine system with locomotives of nominal 20, 16 and 8 h.p. each, without anchor;
- (b) The single-engine system, with one or more anchors;
- (c) Fowler's "roundabout" system, operated by a portable engine or road locomotive.

The direct traction system requires no explanation, the locomotive drawing the implement immediately after it. It is, of course, only suitable on more or less flat and firm ground.

The double-engine system is of the greatest working capacity and is, of course, the most expensive of all. In this two locomotives are used, with one winding drum each, and 450 yards of hauling ropes, made of the

best steel wire. The locomotives work on two headlands opposite each other, each in turn pulling the cultivating implement by means of the wire rope, the engine not pulling letting the rope run slack at the same time advancing a space equal to double the width of the implement employed. The chief advantage of this system consists in the ease with which the entire apparatus can be put in operation and transported farther. As soon as one part of the field has been ploughed the locomotives are at once able, without the aid of draught animals or extra hands, to proceed to the next field, where they can at once begin work, as they haul the implements with them.

In the single-engine systems, the engine works along one end of the field parallel with an anchored pulley at the opposite end, around which the cable passes, being conducted back to the engine by one or more stationary anchors. The same engine thus hauls the cultivating implement both ways alternately.

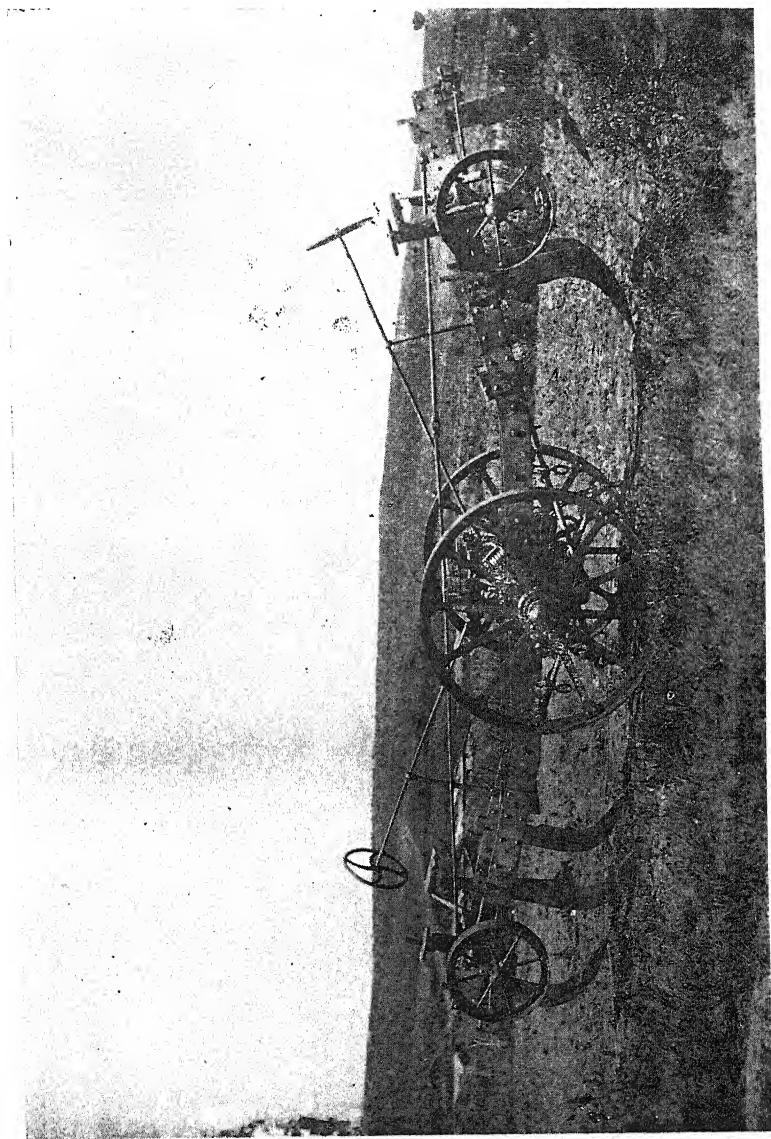
The engines in all the systems can be employed for ordinary road traction purposes, as well as (by means of a flywheel and belt) for driving thrashing machinery, mealie shellers, etc.

STEAM CULTIVATION IN NATAL.

The question of steam ploughing in Natal was brought before the general public for the first time by the purchase, by the Government, of two sets of steam cultivation tackle this year. The restrictions on the movement of cattle necessitated by the presence of East Coast Fever, and the decimation of the herds, in many cases, by the disease, have somewhat hampered ploughing operations in some districts this season; and the purchase of these steam ploughs was effected with a view of assisting the farmers in preparing their land for the new season's planting.

This action has served to bring to notice the advantages of steam cultivation, for, although there were previously several privately-owned sets in Natal, little was known of the work of these latter, most farmers, indeed, being ignorant of their very presence in the country.

The steam cultivation sets owned by Government are of the double-engine system, the plough or other implement being drawn backwards and forwards from the one engine to the other. At the time of writing both of these sets are at work—one on the North Coast (near Phoenix) and the other near Ladysmith,—and in this issue we reproduce some photos that were taken of the tackle for the *Journal*. We may here state that the Natal Estates, Ltd., have a set of steam cultivation apparatus of their own; and when our representative visited the Government plant at Mount Edgecombe recently, he was, by the kindness of the Hon. Marshall Campbell, M.L.C., shown the Natal Estates' set at work and given facilities for taking some photos. of the tackle in operation.



STEAM CULTIVATION AT MOUNT EDGECOMBE.
The Knifer.

OUR ILLUSTRATIONS.

We give two views of the Government plough in operation at Mount Edgecumbe. One of these shows the implement nearing the end of the furrows, with the cable distinctly visible to the right of the plough. No turning round is required, for there are—as may be gathered from the illustrations—two sets of shares, one set of which is always off the ground. By the simple operation of pulling down the raised set, the set of shares that has just finished one lot of furrows is raised; the chargeman takes up his position at the new steering wheel (the two steering wheels can be distinctly seen in the photos.); the engine gives two shrill whistles as a signal to the other engine to “haul away,” and the plough starts on its return journey. Some idea of the length of the furrows it is possible to cut may be gathered from the first of the two smaller illustrations of the ploughing at Ladysmith. In the distance one of the engines is just discernible, with the plough in the middle distance and the cable running up to the foreground of the picture.

That ploughing can be done on hilly ground is evident from one of the two pictures of the Natal Estates’ steam harrow. For the purpose of ploughing and harrowing the ground shown in this picture, one of the engines was stationed on the side of an adjacent hill, as will be understood from observing the direction of the cable from the right or the harrow. The other engine was stationed a considerable distance over on the left—it is shown in the other picture of the harrow. Here again it will be seen that there is no turning necessary—the harrow is drawn backwards and forwards, the necessary steering being done with each of the steering wheels in turn. This picture also shows the van in which the chargeman and the two engineers live.

Our representative was much impressed by the way all the apparatus worked. Plough and harrow both ran at a fine rate, and the former turned the ground over in splendid style. The implements are of the most solid construction; and the combination of strength and efficiency which they embody make them ideal implements for the requirements of modern agriculture.

But the chief obstacle in the way of the universal adoption of steam power for the cultivation of the land is the

HEAVY INITIAL OUTLAY.

Yet the advantages of its adoption weigh heavily enough to warrant every consideration being given to the possibility of its introduction into this country on a large scale; for, apart from the beneficial influence upon the crops that deep and thorough tillage exercises, there are to be considered, in particular, the great saving of time and labour, the independence of animal power—which in this country is an important point,—the thoroughness of the work done, and the general raising of the standard of farming operations. We must “Produce, produce, produce”: with the aid of

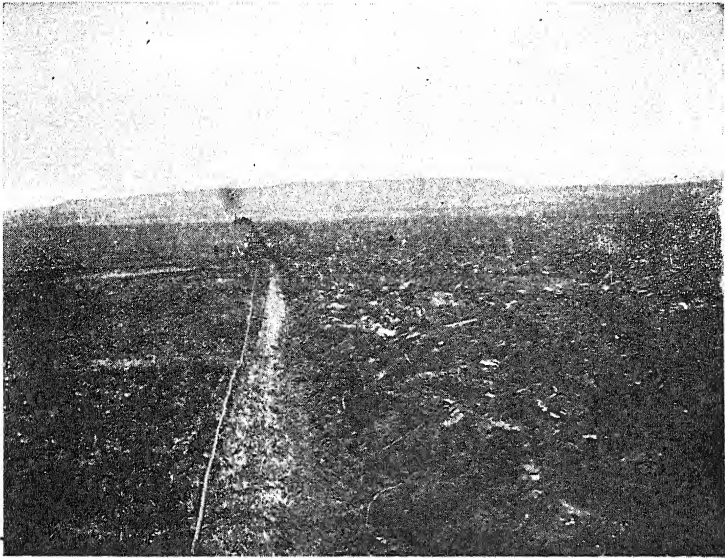
steam power we shall be able to put larger areas under mealies, and get better crops; and all our ploughing, harrowing, and general cultivating operations will benefit by the partial—at least—superseding of animal power by steam.

CO-OPERATIVE PURCHASE ASSOCIATIONS.

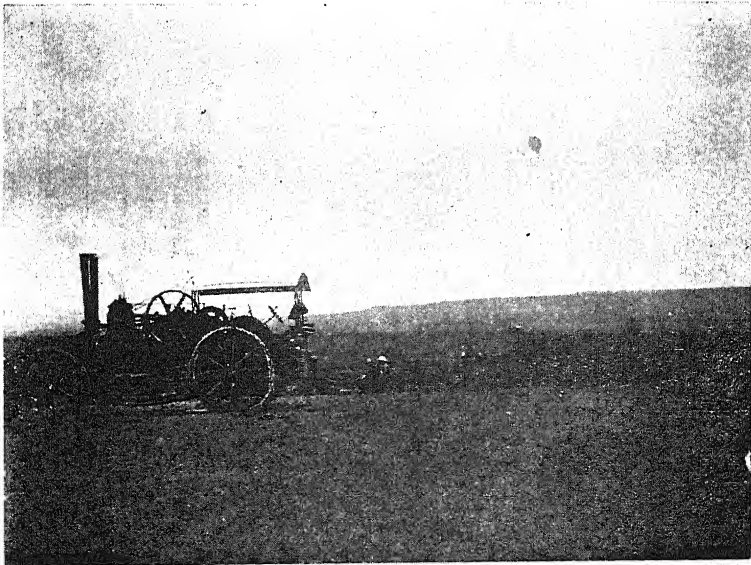
At present the cost of steam ploughing apparatus is a serious item, on the face of it, but the difficulty can, we think, be met and steam ploughing be placed within the reach of the majority of farmers who are unable to incur the heavy expense of privately purchasing the necessary tackle. Some there are among our farmers who are able to adopt steam power—and there are at the present time several outfits in the country at work. What we would suggest to those who are not able, individually, to purchase their own sets, is that they form themselves into associations for the co-operative purchase of steam ploughing tackle. Assuming, for the sake of illustration, that a double-engine system, with plough, harrow, and cultivator, and accessories, would cost £3,000, ten farmers joining together would need to pay £300 each, or twenty farmers £150 each; or shares might be issued, each farmer taking as many shares as he could. Ploughing, etc. could be done on each of the farms belonging to the owners of the machine, in turn, in an order depending upon the situation of the farms relative to each other. In either case the plough, etc., could be hired out to other farmers at a reasonable charge; and at the end of the ploughing season the total amount thus paid in to the treasurer of the society would be distributed among the members in proportion to the number of shares held by each. We think, however, that the former system would be found the more suitable.

The principle, at any rate, to which we would draw the attention of our readers is that of co-operative purchase. The plan has been found to work in other countries—in Germany, for instance, where there are considerably over a hundred steam plough associations in existence; and by hiring out the plant as suggested the owners of the tackle would perhaps be able, not only to pay their own working expenses, but also to repay themselves a certain percentage of their original outlay.

Farmers! in your mealie fields there is a treasure, too: there is wealth the existence of which you have never realised. You have more reason to rejoice than any other section of the population. Maize has been your staple crop in the past: doubly so let it be in the future. Government has given you facilities for exporting your grain, and you have at your disposal markets that you can never, for many years, depress. You can grow as fine mealies as any country in the world, and you have a sunny climate that enables you to dry your grain by natural means and market it in first class condition.



This view gives some idea of the length of the furrows.



The Engine.

STEAM PLOUGHING AT LADYSMITH.

East Coast Fever will have come almost as a blessing in disguise if it will force upon your attention the advantages and possibilities of steam cultivation. On many of your farms you have hundreds of acres lying idle: why not band yourselves into associations for the purchase of steam ploughs, and get as much of that land under mealies as you can?

Movement of Sheep.

INTRODUCTION INTO O.R.C. BY RAIL FROM NATAL.

THE following regulations with regard to sheep entering the Orange River Colony by rail from Natal, have been approved by His Excellency the Governor of the O.R.C. and the Executive of that Colony.

1. Sheep sent by rail from the Colony of Natal into the Orange River Colony except those imported from overseas or thoroughbred sheep *bona fide* intended for exhibition or stud purposes or sheep intended for immediate slaughter purposes (the proof of which intention shall rest with the consignee or person in charge), for which special provisions are made, shall not be allowed to be detrained at any station in the Orange River Colony unless the conductor of the train by which the sheep are carried or the person in charge of the sheep can produce a certificate in the form of Schedule A. that such sheep have been dipped under the supervision of a Stock inspector or other duly authorised Officer in a dipping mixture approved by the Government of the Colony of Natal within a period of not less than ten or more than fourteen days of the date at which they are presented to be entrained.

2. This certificate must be handed to the Stationmaster of the proposed detraining station who shall forward it, if in order, to the Resident Magistrate of the district in which the detraining station is situated, who will hand it to the Stock Inspector of the said district. Failure to produce such certificate in proper order shall render the sheep, subject to the discretion of the Director of Agriculture, liable to be sent back to the station at which they were entrained at the consignor's expense, and the owner or person in charge to the penalty provided for infringing these regulations.

3. Thoroughbred sheep from overseas or thoroughbred sheep *bona fide* intended for exhibition or stud purposes may not be detrained at any station or siding in the Orange River Colony unless accompanied by a certificate as provided in Schedule B, which certificate the conductor or

person in charge of the sheep shall present to the Stationmaster of the proposed detrainning station or siding in the Orange River Colony, by whom it is to be forwarded if in order to the Resident Magistrate of the district to which the sheep are proceeding, who will hand it to the Stock Inspector of such district.

4. Sheep intended for immediate slaughter purposes may not be detained at any station or siding in the Orange River Colony unless accompanied by a certificate in the form of a Schedule A which certificate the conductor or person in charge of the sheep shall present to the Stationmaster of the proposed detrainning station or siding in the Orange River Colony by whom it is to be forwarded to the Resident Magistrate of the district in which the detrainning station is situated, who will forward it to the Stock Inspector of the said district. And further provided that such sheep shall before being detained be found plainly branded on the back with the letter "S" which letter shall not be less than 4 inches long and 3 inches broad.

Compliance with the above Regulations 3 and 4 will exempt the sheep from being dipped within forty-eight hours of being detained as provided in Section 8 of Ordinance No. 14 of 1903, as amended by Section 8 of Ordinance No. 26 of 1906.

5. In these regulations the word "sheep" includes goats.

6. Any person introducing any sheep into the Orange River Colony in contravention of the aforesaid Regulations, shall be liable to a fine not exceeding twenty pounds, or five shillings for each animal so introduced, whichever be the greater, or, in default of payment, to imprisonment with or without hard labour for a period not exceeding two months.

SCHEDULE A.

For Sheep entering the Orange River Colony by rail from the Colony of Natal.

This is to certify that the following sheep and goats have been dipped this day in dip at, and they are, to the best of my knowledge and belief, free from scab.

Signed.....

Stock Inspector or other duly authorised
officer of the Colony of Natal.

Address.....

Date.....

Sheep.

Goats.

Number.....

Marks.....

Owner.....

Person in Charge.....

Proceeding to.....

Detrainning at

This certificate to be handed by the person in charge or the conductor of the train by which such animals are carried to the Station-master at the proposed detraining station, who shall if the certificate is in order allow the sheep to be detrained and forward the said certificate to the Resident Magistrate, Assistant Resident Magistrate or Special Justice of the Peace of the district in which the detraining station is situated, who shall hand the same to the Stock Inspector of the said district.

SCHEDULE B.

This is to certify that the following sheep and goats can be detrained at in the Orange River Colony, and are exempt from Sections 1 and 2 of the Regulations for the introduction of sheep and goats from the Colony of Natal into the Orange River [Colony] by rail.

<i>Sheep.</i>	<i>Goats.</i>
Number.....
Marks.....
Owner.....
Person in Charge.....
Destination.....

Director of Agriculture, Orange River
Colony.

Date.....

This certificate to be held by conductor of train by which sheep or goats are carried, or by person in charge, who will present same to the station Master of the proposed detraining station or siding in the Orange River Colony, who will forward it to the Resident Magistrate of the district to which the sheep are proceeding, who will hand it to the Stock Inspector of the said district.

In accordance with his promise to furnish the Californian State Board of Trade, for its San Francisco display room, with an exhibit of his productions without equal in the world, Luther Burbank recently gave to that organisation the spineless cactus—his latest and greatest production, according to his own estimate;—and to that exhibit he has added his latest development in apple culture, consisting of 196 varieties, all grown on one tree. These vary in size, colour, and taste, as though they had been grown from different stock and hundreds of miles apart. Some, it is stated, are as large as the largest orange, while others are only the size of the smallest crab apple.

Export of Natal Citrus Fruits.

RESULTS OF THE 1907 EXPERIMENT.

NATAL ORCHARD ASSOCIATION'S REPORT.

MR. ERNEST D. GOBLE, the Secretary of the Natal Orchard Association, has prepared an interesting and instructive report upon the results of the Association's experimental export of citrus fruits during the past season. It will be seen that, financially, the export has not been a pronounced success, but it has served to show what can be done and into what channels our energies must, primarily, be directed for the securing of successful results in future seasons. Mr. Goble has placed the situation before us in a clear manner in his "Analysis of Results"; and, in fact, the whole report merits the careful perusal of all interested in this branch of Natal's industrial activity.

Mr. Goble in his report says:—

I have much pleasure in acknowledging the generous support accorded to the Natal Orchard Association from the Government, and also from growers in the splendid manner in which they came forward to test the payableness or otherwise of sending citrus fruit for sale in Great Britain and the Continent.

The actual quantity exported by the Association being just about $1\frac{1}{4}$ million fruits, packed in 9,802 packages, equal to 30,000 boxes, which measured 294 $\frac{1}{4}$ tons of cubic feet. Naturally, having had no previous experience, and no reliable data to work on, mistakes have been made both by growers and its agents, but it is only by these errors of omission and commission is the trade ever likely to be put on a sound footing. To prevent any possibility of misunderstanding, I should like to make it quite clear that the export has not been the financial success anticipated, due to the before mentioned errors, and to the excessive freight charge of 77s. per cubic ton (10 per cent. returnable). The majority of growers, I think, will agree with me when I say that even though the export has not been a financial success, still they have decided definitely that our fruit will travel under certain conditions, and that the price realised is a good one, and likely to advance considerably the more the fruit is known and appreciated. Should, however, no reduction be made in the cool chamber rate of 77s., I am afraid that fruit exportation from Natal

will never pay, and certainly no combined effort will be even attempted next year. The system adopted of each grower's fruit being sent under his mark has proved cumbersome and unworkable, and it will be necessary for some system of "pooling" to be observed in future years, and it is highly desirable that all fruit should be sent to a central packing house, which would ensure uniformity in grade, size and colour. I must confess that the packing of our export was on the whole bad, due to want of knowledge and to our being badly advised by various "experts." Members may consider that settlements have been unduly protracted, but they must remember that the method of financing the export has been undertaken by guaranteed loan from Government, hence it has been necessary that the whole season should be completed before any payments were made, the last account sale only came to hand on the 8th November.

The London charges are very much higher than was anticipated (20 per cent.), but still it must be remembered that a large proportion of the fruit was distributed over Great Britain and the Continent, on which, of course, railage, etc., would be payable. Consignments have been sold in the following towns, viz., London, Birmingham, Manchester, Leeds, Bristol, Liverpool, Glasgow, Dublin, Antwerp, Amsterdam, and Hamburg, from which it will be seen that the fruit has been well advertised. From the knowledge gained this year, it will be possible to reduce the London charges to 10 per cent., though should fruit be sent direct to the provincial towns railage would have to be added. I should not recommend sending fruit to the Continent until further experience is gained, and even then it should be by direct steamer.

Mr. F. L. White, who, it will be remembered, went with the first consignment in order to observe and report upon the possibilities, has already published his report in the *Agricultural Journal*, from which it will be noticed that he considers that there is an excellent outlet provided that more attention is devoted to the details of selection and packing. It only remains for me to urge growers of citrus fruits not to be discouraged by the initial set-back experienced but to again test the London markets, which, provided a reduced freight is arranged, I have no doubt will prove (with the knowledge gained) more remunerative than the past season; it should be remembered that Cape fruit growers are only now beginning to reap the advantage of their last ten or fifteen years' struggle to place their fruit on the London market.

This report would be incomplete with no mention of the loss sustained by the Association in the death of Mr. Dering Stainbank, of Bellair, who was one of the staunchest supporters of the movement, and the largest sender of fruit, and one who would have materially assisted in placing this venture on a sound and prosperous footing.

EXPORT OF NATAL CITRUS FRUITS: SEASON 1907.

Date, 1907.	Name of Steamer.	No. of Packages	Tonnage Cargo Tween Decks.	Tonnage Cargo Tween Decks.	Amount of Freight Tween Decks at 25s.	Amount of Freight, Cool Chamber, 70s plus 10 per cent.	Natal Charges.*	London Charges.†	Exchange and Stamps.	Gross London Accounts.	Net London Accounts.
			ft. in.	ft. in.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
May											
9	Kildonan Castle ...	183	242 3	...	7 11 5	...	0 10 6	4 4 8	0 1 9	25 10 0	21 5 4
16	Saxon ...	264	219 2	121	6 17 0	11 14 10	0 18 5	8 6 8	0 3 7	51 18 9	43 12 1
23	Carisbrook Castle ...	424	303	242 8	9 9 4	24 0 7	1 6 9	11 2 3	0 4 8	67 9 1	56 6 10
31	Kenilworth Castle ...	737	230 5	639	7 4 0	61 10 1	2 18 5	26 1 3	0 13 3	180 8 10	159 7 7
June											
6	Armada Castle ...	814	410 8	541 2	12 16 8	52 1 8	2 13 10	41 6 7	0 11 3	177 1 4	135 14 9
13	Norman ...	997	321 4	838 11	10 0 10	80 14 11	3 12 1	68 13 0	0 16 7	268 6 1	199 13 1
21	Walmer Castle ...	1,087	294	1,002 8	9 3 9	96 10 2	4 3 2	62 1 1	0 16 4	258 11 5	196 10 4
27	Kinfauns Castle ...	1,028	166 7	1,086 3	5 4 1	104 11 1	4 11 0	55 10 8	0 14 9	232 17 5	177 6 9
	Kinfauns Castle ...	18	...	23 2	...	2 4 7	...	...	...	...	...
July											
6	Briton ...	765	148 8	807 4	4 12 11	77 14 1	3 10 0	36 3 2	0 12 2	182 19 8	146 16 6
	Briton ...	26	...	41 4	...	3 19 7	0 6 0	...	...	...	...
	Briton ...	19	...	19	...	1 16 7	0 4 8	0 18 9	0 0 5	6 10 6	5 11 9
8	Prinzregent ...	31	...	37	...	3 11 3	0 7 4	2 16 1	0 0 5	8 9 9	5 13 8
11	Kildonan Castle ...	684	190 4	663 6	5 18 11	64 8 10	3 1 1	24 7 2	0 10 5	150 2 2	125 15 0
	Kildonan Castle ...	57	...	58	...	5 11 8	0 9 8	5 10 9	0 1 0	17 9 9	11 19 0
	Kildonan Castle ...	17	...	27 8	...	2 13 3	0 5 3	...	...	...	...
19	Saxon ...	571	29 4	642 7	0 18 4	61 16 11	2 15 7	22 13 2	0 9 7	138 3 2	115 10 0

July 26	Carisbrook Castle ...	554	36	453 6	1 2 6	43 13 0	2 4 3	27 4 3	0 9 9	144 9 3	117 5 0
	Carisbrook Castle ...	118	...	145	...	13 19 1	0 10 4	4 11 9	0 2 9	37 18 0	33 6 3
Aug. 2	Kenilworth Castle ...	486	...	593 1	...	57 1 8	2 15 4	21 17 6	0 10 0	141 15 6	119 18 0
9	Armada Castle ...	328	37 4	349 4	1 3 4	33 12 6	1 17 1	10 13 9	0 5 5	75 16 9	65 3 0
15	Norman ...	204	...	270 8	...	26 1 0	1 6 6	8 5 5	0 4 2	58 7 3	50 1 10
23	Walmer Castle ...	125	...	186	...	17 18 0	0 19 0	5 8 11	0 2 9	39 19 6	33 10 7
30	Kinfauns Castle ...	70	...	105 6	...	10 3 0	0 12 1	1 19 6	...	11 0 8	Loss
Sept. 4	Briton ...	41	...	61 6	...	5 18 4	0 9 4	0 9 6	...	6 1 2	Loss
12	Kildonan Castle ...	70	45	36	1 8 9	3 9 4	0 9 9	2 2 4	0 1 7	21 15 3	19 12 11
19	Saxon ...	44	...	58 8	...	5 12 11	0 11 2	2 15 10	0 2 1	28 2 3	25 16 5
25	Carisbrook Castle ...	40	..	46 8	...	4 9 10	0 10 5	1 12 9	0 1 7	19 12 6	17 19 9
		9,802	2,675 1	9,111 2	83 11 10	876 18 9	43 18 8	463 3 11	7 18 10	2,377 7 6	1,909 0 9
<p>67 tons 228 tons</p> <p>294½ tons at 77s. £960 10 7</p> <p>per ton Cool Chamber, 40½ per cent. 40½ per cent. 20 per cent. 4½ per cent. 35 per cent. To Grover.</p> <p>£1,134 15s. 9d.</p> <p>Say total 65 per cent. Charges. and 35 per cent. To Grover.</p> <p>100</p>											

* Natal charges include B.L. and Exps, wharfage, ¼ per cent. on value; supervision, raising, entries, and shipping, 2s. 6d. per 40 ft. paid to A.B. Co.

† London charges include cartage, sale commission 5 per cent., and charges and agents' commission 5 per cent.

ANALYSIS OF RESULTS.

(a) That citrus fruits can be carried to European markets successfully, and fair prices obtained for good fruit.

(b) That to insure their arrival in marketable condition, they must be sent in cool chambers.

(c) That present freight for cool chamber accommodation (70s., and 10 per cent. primage) is at present too high to insure a commercial success.

(d) That Home charges can be reduced by 10 per cent. with experience gained.

(e) That considerable economies can be made in Natal with respect to cost of boxes and packing.

EXPLANATORY NOTES ON SCHEDULE.

Twenty-two shipments were made, consisting of 9,802 packages, equal to about 30,000 boxes, of which 67 tons were sent either on deck or 'tween decks rate 25s., and 228 tons per cool chamber rate 70s., and 10 per cent. primage (or 77s.); total freight paid to Union-Castle Company, £960 10s. 7d., equal to 40½ per cent. of the gross realised; Natal charges, £43 18s. 8d., includes secretary's commission, wharfage, shipping supervision, and bills of lading, etc., equal to 4 3-8ths per cent.; London charges, £463 3s. 11d., includes railage and commission paid in England, equal to 20 per cent., or, say, a total of charges of 65 per cent., leaving a balance of 35 per cent. to be distributed amongst growers, from which would still have to be deducted the cost of boxes, labour and railage to port, not to mention the value of the fruit.

MESSRS. HUDSON & SON'S REPORT.

The following report regarding fruits received from Natal on the London market from 1st June to 30th September, 1907 (total imports: 9,400 packages) has been supplied by Messrs. Hudson & Son:—

The first shipment of Natal fruit came to hand by the S.S. "Kildonan Castle," and arrived here on the 1st June, since which date regular weekly shipments have been received.

NAARTJES.

Dealing first with this fruit, the total amount received was some 5,200 cases, each case containing from 90 to 120 fruits, and 2,000 packages, consisting of four trays, each tray containing on an average 24 fruits. The fruit that arrived in good condition was well received, and although the early shipments were poor, of little colour, and inclined to be green, the latter consignments brought some very fine, nice coloured fruits.

ORANGES.

Some 2,000 cases came on the market, and, on the whole, could not be classed as best quality fruit; they were poor, both in size and colour,

and, moreover, did not arrive in a particularly good condition, but we think this condition of affairs is to be accounted for largely in the packing, which we are dealing with under another paragraph.

MANDARINES.

Some 300 packages came to hand, but this fruit was disappointing, having no appearance on arrival, and being very flabby; they do not appear to carry nearly so well as the naartjes, and do not meet with the same favour at the hands of the trade.

The demand for the above fruit at first was very slow, but improved generally as the fruit arrived better in shape and condition, and got better known, and we feel confident that a good demand has been created this season, and a firm start been made in establishing these fruits on the various markets. We consider that a mistake was made this season in sending the fruit over here too early, as the first shipments arrived in a small and not properly formed condition, and a lot of it sour; green fruit does not colour up well here, but generally withers in the same green condition, and we think if the arrival of these fruits could have been delayed a month, and continued two months longer, the actual financial result would have been better.

PACKING.

This is a matter which requires great attention, and admits of great improvement, as it affects the condition of the fruit, and this is the basis on which the whole success of the business depends. In the packing of oranges we consider that no wood wool is required at all, some of the shipments we have seen contained too much packing of wood wool in the case, and this only heats the fruit; rather more pressure should be used in the packing, as the cases arrive here with a great deal of room to spare, whereas oranges shipped from California and other countries come in a perfectly tight condition. The cases that the oranges have come in have not been strong enough to bear the weight of the fruit, and have often had to be re-coopered on this side. Trays are the more popular package, but at the same time cases have grown in favour, and will do so more when the selection of the fruit and the packing improves. We would suggest packing the larger and finer fruits in trays, and the smaller grades in cases: trays are bought by the high class fruiterers, who want more show, than actual quantity.

GRADING AND SELECTING THE FRUIT.

The grading throughout has been very irregular, and no dependency could be placed on the counts; a buyer selecting small counts expects finer fruit, but he often gets large and small mixed, and if good prices are to be made good fruit must be shipped. It is a mistaken idea that anything will sell in London; it certainly will sell at a price, but not at a high one. A shipper will make more money on 100 cases of really fine fruit than 200

cases of the irregular and mixed description such as we have been receiving.

ADVICE OF SHIPMENTS.

The greatest difficulty we have had to contend with this season is the lack of particulars given of the shipments. It is very essential that we should have full particulars as to what the arriving shipment consists of, as we have to make arrangements beforehand, and there is no time to have the whole shipment examined. The various markets wire us their probable requirements according to the state of their market, and unless we know what we are sending it is all chance. A certain mark one week contain mostly oranges, and the next week the same mark turns out to be naartjes, and provided we know this beforehand, it does not matter much, but it is most essential that we do have these particulars before arrival. The various Provincial and Continental markets have been tried with varying results, but the same remark applies to these markets as applies to the London market, viz., that as the fruit becomes better known on them, it will make a better price.

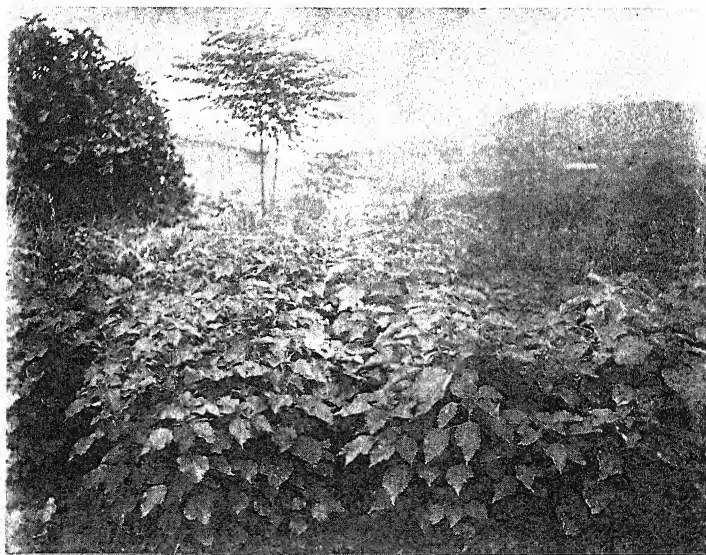
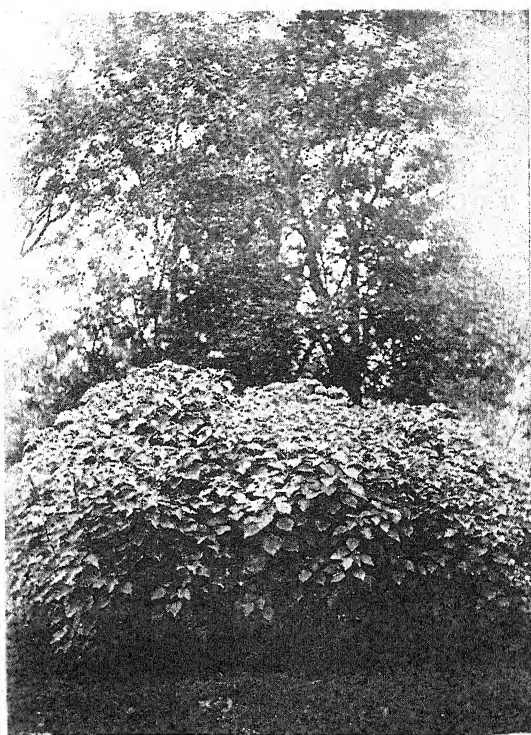
TO SUM UP,

we would recommend a uniform package being used, containing stated grades of certain counts, of the finest and best coloured fruit, cases marked on the end with full particulars as to contents, the marking should not be on the sides.

The best results have been obtained when the fruit has been shipped in cool chamber at a temperature of from 36 to 38 degrees, but with the packing we suggest, we would advise further experiments being made in shipping this fruit out of cool chamber, but if this is done, it must of course be made perfectly clear to the shipping company that the fruit is stored in the coolest possible part of the ship, as some of the fruit received this season which was not shipped in cool chamber would lead us to suppose here that it had been nearly half cooked, and we cannot think that it could have been stored in a cool place on the voyage.

With the keen competition that these fruits have to contend with on their arrival here, it is impossible to get long prices for them, and further any small difference saved in freight is a considerable item, and must mean profit to the shipper.

In conclusion, we can only again state, we think that with careful handling, there is a good future for Natal fruits on this market, and we quite recognise that this season is purely an initial and an experimental one, and we think that any shipper who will give his personal attention to the packing and grading of this fruit will find that the results will show him a fair and reasonable margin of profit.



RAMIE AT BAINE'S DRIFT.

Ramie at Baynes' Drift.

THE illustrations facing this page are from photographs that were taken recently of some ramie plants growing at "Settle," Baynes' Drift, concerning which Mr. F. J. Smith has very kindly furnished us with the following particulars:—

The ramie shown in the upper of the two illustrations was planted in December, 1905, by splitting up two roots obtained from a Maritzburg resident. The cuttings were planted out in 3-foot rows and 3 feet apart in the rows. The roots have now spread so that there is little space between the plants. The ground is good, and although not manured recently, is in good heart. At the time of writing the stems are ready to cut for fibre purposes. There are from 40 to 50 stems from each root with the diameter of that of an ordinary lead-pencil. The height of the plant is from 5 to 6 feet. Three crops could be grown at Baynes' Drift before the frost stops further growth.

The second picture shows some ramie planted last year from cuttings. The height of the plants is about 3 feet 6 inches. The soil in this case is poor, as a lot of subsoil was deposited there some years back.

Mr. Smith says that he has found the raising of ramie from seed a tedious process, as the seed is so small, and it is necessary to protect the young plants from the direct rays of the sun and heavy rain. In January, 1907, some roots which were seedlings in January, 1906, were split up into 20 or 30 roots and an acre was planted out with them in a field which had grown Algerian oats for some seasons. These took root hold last autumn, and with no attention this year have stems 3 to 4 feet high. Mr. Smith has not planted more ramie this year on account of the want of suitable machinery for stripping, decorticating, etc.

Mr. Smith concludes: "Ramie grows well enough in this thorn country in a tolerably wet season, but I should hesitate to plant much in a thorn country unless I could irrigate part or the whole of the area planted. In some places, like the Town Bush Valley, I am told ramie grows to a greater height than it does here."

The building of the Western Australian rabbit-proof fence has been completed after five years' work. The length is 2,036 miles, and the cost nearly £250,000. The boundary riders report that rabbits exist in thousands on the eastern side.

The Distillation of Alcohol.

NEW INDUSTRIES FOR NATAL.

DENATURED ALCOHOL.—ITS SUITABILITY AS A SUBSTITUTE FOR PETROLEUM FUEL.—TRIALS OF INTERNAL-COMBUSTION ENGINES IN U.S.A.—DISTILLATION OF WOOD SPIRIT OR WOOD NAPHTHA.—WHAT CAN BE DONE WITH OUR WASTE WATTLE TIMBER.

THESE are times of strenuous endeavour, of seeking after new sources of wealth, of the organisation of our agriculture and industries allied thereto. From the soil, primarily, must come our greatest wealth; and for the utilisation of the raw material that the farmer can provide may be built up large industries employing great numbers of workers and assisting generally in increasing the prosperity of the country. It is an interesting fact—a fact that merits the attention of everyone interested in the development of the country—that two at least of our most important agricultural industries furnish good opportunities for the organisation, upon prosperous lines, of industries that would, in the course of a few years, prove a source of considerable wealth to the Colony. These are the sugar and wattle bark industries. From molasses we get alcohol, which, after having been denatured, can be profitably placed upon the market to take the place of petroleum fuel for the use of oil engines, lamps, etc. From wattle bark we can extract tannin for export—i.e., instead of exporting the bark itself—thus tapping the American markets; and, further, from the wattle wood itself—which is at present entirely wasted or used for mine props, firewood, etc.—we can extract methyl alcohol (known commercially as wood alcohol, wood spirit and wood naphtha), acetic acid, acetone, etc.

I.

DENATURED ALCOHOL.

We are, unfortunately, not yet in possession of particulars regarding the extraction of tannin from bark, but as soon as sufficient information on the subject becomes available we will place it at the disposal of our readers.

In the present article we would like to once more draw the attention of readers to the desirability of extending the production of distilled spirit in connection with our sugar industry. The matter has several times been referred to in these pages—very ably, for instance, by Mr. Walter H. Pay, F.C.S.,* and Mr. G. C. Williams,** and by “Ergates” last

* “Alcohol as a Source of Power,” by Walter H. Pay, F.C.S., Member Soc. Chem. Ind. [*Journal*, June, 1907].

** “Denatured Alcohol,” by G. C. Williams. [*Journal*, June, 1907.]

April in an article embodying the views of Mr. Gilbert Wilkinson, of the Ottawa Sugar Estate, who has had considerable experience in distilling,—and we wish again to emphasise the fact that we have at our very doors a large market which can take all the alcohol we can produce for years to come. Motor cars and cycles and motor boats are more and more being used, under suitable conditions, all over the country; on farms and elsewhere oil-engines are coming into use; and, in fact, internal-combustion engines of all kinds and for all sorts of uses are yearly coming into the country. There is a splendid opening for us to supply the whole of South Africa with denatured alcohol for use in such motors and in lamps. That we can fulfil the requirements—or, at any rate, a portion of them—of the South African markets, is evidenced by a statement made, in a letter to Mr. Pay (quoted in the article already referred to) by Mr. T. L. Hughes, of the Natal Chemical Syndicate, that “it is a well-known fact that there is not a single distillery in Natal working up to maximum output.” Mr. G. C. Williams, also, in his article above referred to, said: “I am informed by one of the sugar growers on the Coast that some one million gallons of spirit could be made at once, fit of industrial purposes, and that this could be sold at a profit to them at a price of one shilling per gallon.” At present, Mr. Williams remarks, this is lost to the Colony; and continues: “Experiments have been made both in Germany and United States of America, that prove without doubt that alcohol can be used in most kinds of motors and lamps, and can even compete in cheapness with petrol, gasolene and petroleum. If this is the case in countries where petroleum is close and plentiful, how much more economical it should be in a country like South Africa whose oil comes oversea some 6,000 miles.”

The question of a possible

SUBSTITUTE FOR THE PETROLEUM FUELS

will become of increasing importance as time goes on. At the present time we import most of our fuel, and we may continue to do so, but prices of petroleum are going up, and we shall be compelled, sooner or later, to turn to our own resources. In Europe, in fact, during the last ten years the high prices of the oils used as fuel in internal-combustion engines have led to extended efforts being made to find other suitable and economical fuels. Alcohol has, among these, received much attention; and there has been manufactured and used in Germany a considerable number of engines specially designed for this fuel.

The two most important properties of a liquid fuel, which determine its availability or adaptability for use in an engine, are its heat of combustion and its volatility. The useful work which can be obtained by burning a definite amount of any fuel is in general approximately proportional to the amount of heat generated by the combustion of the fuel. In this amount of heat the various fuels differ greatly. Moreover, a liquid fuel must be converted into a gas or vapour before it can be burned

in an explosion engine. Hence the ease or difficulty of vaporising the fuel has a great effect in determining the form and complexity of the vaporising apparatus, and also has considerable influence upon the economy of the engine and the general difficulties that may be encountered in its satisfactory operation.

Before any liquid fuel can be used in the usual form of explosion engine, it must be vaporised, and this vapour must be mixed with air in proper proportions. Thus, the preparation of the combustible mixture involves three steps: First, vaporisation of the fuel; second, mixture of the fuel vapour and air; and third, the proper adjustment of the proportions of fuel and air.

The differences in the devices used in engines to accomplish these objects constitute the widest variations in the detailed design of existing engines. In some of these devices the fuel is boiled in a separate chamber, called a vaporiser, from which the vapour flows into a stream of air entering the engine, the amount of vapour being regulated by a valve just as in the case of an engine using illuminating or producer gas.

In another type of vaporiser the fuel is dropped on a hot plate over which the air flows, the proportion of fuel being regulated by the amount of liquid fuel forced against the plate. Paraffin requires a high heat to vaporise it completely, since its boiling point is high, and hence it is much used with vaporisers of the hot-plate type. Alcohol will work satisfactorily with a vaporiser of this type if the temperature of the hot plate is properly regulated.

Gasolene is easily vaporised at ordinary atmospheric temperature and hence requires no hot plate or heated vaporising chamber. Usually the liquid gasolene is admitted directly into the air entering the engine through a device known as the carburetter, which is intended to regulate the proportion of fuel and to spray it uniformly through the mass of air so that as the liquid spray turns into vapour it will produce a homogeneous mixture of air and vapour. Alcohol can also be used in a gasolene carburetter.

UNITED STATES INVESTIGATIONS.

The possibilities and advantages of the use of alcohol as a fuel in internal-combustion engines were investigated not many months ago by Professor Chas. E. Lucke and Mr. S. M. Woodward for the United States Department of Agriculture, the results of their investigations being afterwards published in the form of a bulletin. The specific objects of this investigation were: first, to determine whether the gasolene and paraffin engines at present on the American market can run on alcohol as fuel; and, second, to determine as far as the limited time and means available permitted, the improvements which might be desirable in the design of engines manufactured specially for alcohol.

Eight different engines were examined, and 192 consumption tests were reported upon. Each of the engines was run on alcohol as well as on

gasolene or paraffin, for which it was designed. The engines used were: (1) A 15-h.p., 2-cylinder, vertical, 4-cycle gasolene engine; (2) and (3) 6-h.p., horizontal, 4-cycle gasolene engines; (4) a 6-h.p., vertical, 4-cycle gasolene engine; (5) a 6-h.p., horizontal, 2-cycle kerosene engine; (6) a 40-h.p., 4-cylinder automobile gasolene engine; (7) a 40-h.p., 4-cylinder automobile gasolene engine; (8) a 2-h.p., vertical, 2-cycle marine gasolene engine.

Careful tests were made; and as a result of the investigations, it was found that:

(1) Any gasolene engine of the ordinary types can be run on alcohol fuel without any material change in the construction of the engine. The only difficulties likely to be encountered are in starting and in supplying a sufficient quantity of fuel, a quantity which must be considerably greater than the quantity of gasolene required.

(2) When an engine is run on alcohol its operation is more noiseless than when run on gasolene, its maximum power is usually materially higher than it is on gasolene, and there is no danger of any injurious hammering with alcohol such as may occur with gasolene.

(3) For automobile air-cooled engines alcohol seems to be especially adapted as a fuel, since the temperature of the engine cylinder may rise much higher before auto-ignition takes place than is possible with gasolene fuel; and if auto-ignition of the alcohol fuel does occur no injurious hammering can result.

(4) The consumption of fuel in pounds per brake horse-power, whether the fuel is gasolene or alcohol, depends chiefly upon the horse-power at which the engine is being run and upon the setting of the fuel supply valve. It is easily possible for the fuel consumption per horse-power hour to be increased to double the best value, either by running the engine on a load below its full power or by a poor setting of the fuel supply valve.

(5) These investigations also showed that the fuel consumption was affected by the time of ignition, by the speed, and by the initial compression of the full charge. No tests were made to determine the maximum possible change in fuel consumption that could be produced by changing the time of ignition, but when near the best fuel consumption it was shown to be important to have an early ignition. So far as tested, the alcohol fuel consumption was better at low than at high speeds. So far as investigated, increasing the initial compression from 70 to 125 pounds, produced only a very slight improvement in the consumption of alcohol.

(6) It is probable that for any given engine the fuel consumption is also affected by the quantity and temperature of cooling water used and the nature of the cooling system, by the type of ignition apparatus, by the quantity and quality of lubricating oil, by the temperature and humidity of the atmosphere, and by the initial temperature of the fuel.

(7) It seems probable that all well-constructed engines of the same size will have approximately the same fuel consumption when working under the most advantageous conditions.

(8) With any good small stationary engine as small a fuel consumption as 0.70 pound of gasoline, or 1.16 pounds of alcohol per brake horsepower may reasonably be expected under favourable conditions. These values correspond to 0.118 and 0.170 gallon respectively, or 0.95 pint of gasoline and 1.36 pints of alcohol. Based on the high calorific values of 21,120 British thermal units per pound of gasoline and 11,880 per pound of alcohol, these consumptions represent thermal efficiencies of 17.2 per cent. for gasoline and 18.5 per cent. for alcohol. But calculated on the basis of the low calorific values of 19,660 British thermal units per pound for gasoline and 10,620 for alcohol, the thermal efficiencies become 18.5 for the former fuel and 20.7 for alcohol. The ratio of the high calorific values used above is, gasoline to alcohol, 1.78. The corresponding ratio of the low calorific values is 1.85. The ratio of the consumptions mentioned above is, alcohol to gasoline, 1.66 by weight, or 1.44 by volume.

II.

DESTRUCTIVE DISTILLATION.

Every year there are wasted many tons of wattle wood in plantations that are too far removed from the railway to pay for their transport *en route* to the markets as mining props, fencing posts, firewood, etc., and information regarding other means of disposing of this waste will doubtless prove of general interest. Apart from tanning and paper making—which are chemical industries that have been established for hundreds of years—there are other industrial uses, of more recent origin, which are of agricultural importance because they offer a means of utilising these wastes of the plantation and of the saw mill. The more important of these are concerned with destructive distillation, recovery of turpentine, rosin and paper pulp, preparation of alcohols, and separation of acids. Of the various processes employed for manufacturing chemical compounds from wood, that of destructive distillation is probably at present the most important. The industry is an old one, and is quite well developed in Germany, Russia, Norway and Sweden, and less extensively in France and England.

Methyl alcohol, acetates, acetone, charcoal, turpentine, wood oil and oxalic acid are directly or indirectly obtained on a commercial scale from woods, and the yield is governed largely by the specific gravity, weight and kind of wood, as well as by the manner in which the manufacturing process is conducted. Many other farm products, such as sugar cane, mealie stalks, straws, etc., will yield some of these products, and it is possible that many other wastes may in the future be utilised in this way. So far, however, but little attention has been given to these materials, and for economic reasons they are not employed.

In consequence of the general demand for information as to the nature and uses of chemical compounds manufactured from wood and the processes and equipment used in their production, the Bureau of Chemistry of the United States Department of Agriculture issued a circular on the subject about the middle of the present year, prepared by the Chief of the Leather and Paper Laboratory (Mr. F. P. Veitch). This publication contains a considerable amount of interesting information, and although the questions involved are rather technical, the processes are explained as simply as the subject matter will permit.

Mr. Veitch remarks that, while any kind of wood may be used for the production of alcohol, acetates and charcoal, the hard woods give much larger yields than do the soft woods, while resinous woods yield the most turpentine, wood oils and tar.

It is advisable that the wood used for destructive distillation should be as dry as possible, as much time and fuel are wasted if green or wet wood must be dried in the retort and the temperature raised under such conditions to the point at which distillation begins. For these reasons it is the best practice to cut and stack the green wood, which contains from 20 to 50 per cent. of water, from eight months to two years before it is to be used in order that it may become well seasoned. Even seasoned woods contain from 12 to 25 per cent. of water, which must be evaporated in the retort before the disintegration of the wood begins.

The capital required to maintain a two years' supply of wood for a plant using 20 cords of wood a day varies from £4,000 to £8,000, so that in many cases wood not thoroughly seasoned is used in preference to making this outlay. Such a practice, of course, increases the operating expenses considerably, and drying ovens heated by the waste steam and gases of the plant have been used in some cases to dry the wood quickly before it goes into the retort. This is undoubtedly the better practice, and whenever it is possible plants should be equipped with such drying ovens, thus decreasing the amount of capital invested in wood and at the same time securing large yields, as during seasoning by exposure wood loses weight from rotting and from the solution of water-soluble constituents, and consequently gives a lower yield of distillation products.

APPARATUS.

The apparatus required for the destructive distillation of wood consists of (1) retorts or ovens, in which the distillation is carried on and the chief chemical reactions involved in the production of the crude products take place; (2) condensers, in which the condensable vapours are liquefied; (3) stills, in which the crude products are separated, concentrated and purified; (4) mixing pans for the preparation of acetate of lime; and (5) general apparatus, such as evaporating pans, storage tanks, coolers, pumps, etc.

A plant to destructively distil 12 cords of wood per day will require, approximately, the following equipment:—2 oven retorts, each 32 feet

long, or 12 round retorts; 4 oven coolers, each 32 feet long, or one hundred 100-pound charcoal cans; 24 to 26 charcoal cars of iron (if oven retorts are used); 1 tar still; 1 lining still; 1 alcohol still; 1 steam pan, 14 feet long, 9 feet wide, 6 inches deep; 1 settling pan, 8 feet long, 9 feet wide, 4 feet deep; 1 100-h.p. boiler; 1 10-h.p. engine; 1 set iron mixing gear; 1 blow tank for elevating liquid acetate to settling tank; 1 storage tank; 1 mixing tub, wood; 2 or 3 wooden storage tanks; 1 copper condenser for each retort; 1 copper column still and condenser; pumps to supply water for condenser. A plant for the recovery of turpentine only would need much less equipment, and the apparatus would be of a different character.

GENERAL PROCESS OF DISTILLATION.

The round retorts are filled with the wood by hand. When ovens are used the wood is loaded on iron cars holding from one to three cords of wood, and from 2 to 8 cars run into the oven. The doors in all cases are made gastight, if possible. The retorts are heated slowly and the distillation is continued for from twenty to thirty hours, the progress being indicated by the flow of liquor and the gradually heating of the front of the retort from top to bottom. When the entire front of the retort has reached a fairly uniform temperature the fires are allowed to die down, and, when the retorts or ovens are sufficiently cool, the charcoal is removed.

If retorts are used the charcoal is placed in covered cans; but with ovens, coolers are used in which the charcoal is allowed to remain until thoroughly cool. The time required for distillation, as already stated, varies from twenty to thirty hours and averages about twenty-four hours. The distillate from the retorts passes to the condensers, where the acid, alcohol, and other valuable constituents are condensed to liquid form and then carried to a large wooden settling tank, which may be either underground or overhead, where it is allowed to stand for several days in order that the tar may settle. The uncondensed gases pass from the condensers to the gas mains and are either carried directly to the furnace and burned there or go to a gas holder, from which they are used. If the tar is not otherwise treated it is blown under the boilers with a steam jet and burned.

In addition to the distillation already mentioned, resinous woods may be treated by other processes for the recovery of the turpentine and rosin they contain. For various reasons these processes have received but little attention in the past. Their successful operation requires more chemical and technical knowledge, and a more extensive plant than the methods commonly employed in recovering turpentine and rosin. Heretofore the value of the products, some of which were not utilised, did not justify the greater cost of these processes.

In the destructive distillation of wood the yields obtained in practice are much below those given under laboratory conditions. This may

be due to destruction caused by local overheating in the retorts, loss of vapours around the doors of the retorts, incomplete carbonisation, or imperfect condensation. Losses may also occur from incomplete or over-neutralisation of acids with milk of lime, or to incomplete separation of alcohol and acids from the tar, or of alcohol from water. All of these points need the constant watchful attention of the superintendent in order that such losses may be reduced to a minimum. Indeed, yields are largely controlled by the experience and technical knowledge of the superintendent. The almost total absence of chemical control in these industries abroad doubtless accounts for many unprofitable plants, the source of whose failure cannot otherwise be discovered.

The establishment of a wood-alcohol industry in the Colony, and the extension on a large scale of our present very small ethyl alcohol industry, are questions that deserve the serious consideration of all interested in the industrial progress of Natal. As we have seen, we have an abundant and never-failing supply of material for the production of both these forms of alcohol, and we likewise have good markets—both in South Africa and abroad.

Mr. Veitch's paper contains numerous illustrations of apparatus used in the destructive distillation of wood—including various forms of retorts, condensers, wood cars and charcoal coolers, and plants of modern distillation plans and refining apparatus—and should any of our readers desire to refer to it, we shall be pleased to lend our copy of the Circular.

After the foregoing article was written we received an interesting article on the subject of the destructive distillation of wattle wood from Lieut.-Col. G. Leuchars, C.M.G., D.S.O., who has given the matter considerable attention. Col. Leuchars, in conjunction with his brother—Mr. J. W. Leuchars—was led to investigate the possibilities of the destructive distillation of wattle wood, mainly through the threatened over-production of the wood in question; and the investigations have satisfied them “that it will be possible, with capital, to convert the wood, by destructive distillation, into marketable products.” Col. Leuchars' article, which we print below, will doubtless find many readers interested in this important subject.

The Destructive Distillation of Wattle Bark.

By LT.-COL. G. LEUCHARS, C.M.G., D.S.O.

The very large areas of land in this country being put under wattle cultivation for the production primarily of bark for tannin brings home to us the fact that in the very near future the limited market for the wood which now exists will be swamped with an over production, and only those situated near the large centres will be able to dispose of their wood.

This condition of things led my brother—Mr. J. W. Leuchars—and myself to make investigations with the idea of finding some new outlet for wattle wood. The investigations so far made have satisfied us that it will be possible with capital to convert the wood, by destructive distillation, into marketable products in the form of acetate of lime, charcoal, wood spirit and tar. I availed myself of the opportunity while in England this year of obtaining information on the subject, and now propose to state briefly the results, in the hope that those interested and others who have knowledge on the subject will assist by giving the benefit of their opinions and any information they may possess.

Two separate and independent laboratory tests were made from samples of wattle wood by Doctor Nuriaa Wirtz, London, and Messrs. Davis Bros., of the Manchester Technical Laboratory. An endeavour was made to obtain tests from the Imperial Institute (which receives a subsidy from the Natal Government), but without success.

Dr. Wirtz says: "I find it (the wood) compares very favourably with other woods generally used in destructive distillation. As a matter of fact, it comes quite up to birch and oak, which are the best, as it gives even a little more acetic acid than the latter."

The results from Messrs. Davis Bros., which are practically the same as those from Dr. Wirtz, are as follows:—

	Percentage.	Per Ton of Wood.
Charcoal	33·2 per cent.	6 64 cwt.s.
82 per cent. Acetate of Lime	9·05 "	2·03 lbs.
Methyl Alcohol	·81 "	2·15 gals.

The market price of these products is as follows:—

	£	s.	d.
Charcoal (in England)	3	0	0 per ton
Acetate of Lime (in England)	12	0	0 "
Methyl Alcohol (in England)	0	2	6 per gal.

The tests made by Messrs. Davis Bros. were from samples of crude pyroligneous acid obtained from the wattle wood by Mr. T. L. Hughes, of the Natal Chemical Syndicate, S.C. Junction, by destructive distillation, in a small experimental retort erected by him for the purpose.

The charcoal compares very favourably with the best English charcoal, as the following analysis shows:—

Moisture	5·08 per cent.
Volatile Matter	6·44 "
Carbon	87·32 "
Ash	1·16 "
	<hr/> 100·00 "

Charcoal would have to be disposed of locally, as it is a material that will not stand carriage for more than a short distance. At present only a limited local demand exists; but this would increase when the

advantages of charcoal for domestic purposes were realised, and when gas engines came more into general use. It might be possible with cheap water power and lime to convert the charcoal into calcium carbide; but for the present and until iron and steel works are established in this country, we will assume that most of the charcoal would be used in the furnaces of the retorts for treating the wood.

The acetic acid, owing to the difficulty of carrying it by sea, would have to be converted into grey acetate of lime, worth about £12 per ton. In the manufacture of this goods, a cheap lime, free from aluminium and magnesia, is required. Such a lime would be obtainable from deposits discovered by Mr. St. Vincent Erskine, twelve miles from Hermannsberg Road Station, on the Greytown line.

An important point which had to be determined was whether a sufficiently large demand existed for acetate of lime to warrant the spending of capital in machinery (which is costly), and whether any large new supply would seriously affect the market. The result of inquiries made shows that any supply from Natal would make little appreciable difference in the total world's supply, or in the price. It is ascertained from figures obtained that the total exports from the United States in 1898 amounted to 16,700 tons, valued at £6 8s. per ton, while in 1906 they amounted to 31,000 tons, valued at £12 12s. per ton. It will thus be seen that the exports from the United States have nearly doubled in eight years, and that the price has doubled also.

Acetate of lime is the principal material used in the manufacture of acetic acid and acetone, which in turn are used in the manufacture of anylic acetate, chloroform, acetic ether and cordite. Most of the acetate of lime is imported into Great Britain, Germany and Belgium. Acetate of lime is used also in the manufacture of white lead. The following is an extract from the *Journal of the Society of Chemical Industry* of May 15th, 1905: "The manufacture of acetone in India from locally grown blue gum is being taken up by the military authorities. Acetone is the solvent used in the manufacture of cordite at the Government cordite factory at Wellington, in Southern India, and has at present to be imported at great cost. A large consignment of the Indian timber was sent Home early last year for the purposes of distillation, and the satisfactory results obtained show that the manufacture of acetone in India is a perfectly feasible project."

The cost of machinery and production is a vital point. Estimates have been obtained from makers of machinery in Germany, which may appear to some rather costly; but when money becomes more plentiful no difficulty should be experienced in raising the necessary capital, especially as the wood is already available, and an immediate return could be looked for. The cost of the latest and up-to-date machinery for dealing with 10,000 tons of wood per annum, or the production from about 4,000

acres, would be about £20,000 and the following is a rough estimate of expenditure and receipts for dealing with the above quantity of wood:—

EXPENDITURE.		RECEIPTS.	
	£		£
10,000 tons Wood at say 5/- ...	2,500	600 Tons Acetate of Lime ...	6,000
Labour, including Management...	1,300	21,000 gals. Wood Naphtha at 2 6	2,622
Lime, 300 tons at £2 ...	600	(Methyl Alcohol)	
Repairs and Depreciation ...	820		
Balance profit ...	3,402		
	<u>£8,622</u>		<u>£8,622</u>

Besides the above, about 300 tons of tar, of doubtful value, and 3,000 tons charcoal would be obtained—and, failing a market, 2,000 tons of the latter would be used for fuel, leaving about 1,000 tons available for sale.

It will be noted that only 6 per cent. of acetate of lime, on the wood treated, has been allowed on the credit side. This percentage is taken because of an article on wood distillation by Max Muspratt appearing in a number of *The Journal of the Society of Chemical Industries*, where that percentage is given as the estimated return from birch and beech; and also the same return was obtained from nine tons wattle wood put through a somewhat primitive factory near Liverpool. There is no reason why, with up-to-date machinery and scientific management, the percentages given in the laboratory tests should not be obtained.

The very interesting article on wood distillation by Max Muspratt referred to above is written with the object of showing that it would be a paying proposition to plant waste lands in England for the purpose of wood distillation, and, although a period of thirty years would elapse before the trees could be used, the writer maintains that it would be a remunerative undertaking. This surely points to the fact that with cheap wood already to hand a payable industry could be established. It has been estimated that 80,000 acres of land are under wattles in Natal and quite 200,000 tons of wood per annum would be without a local market and available for the new industry. In America and elsewhere factories have to follow the forests as they are cut out, this necessity would be avoided in Natal as factories could be established in different centres and wood would always be available owing to the rotation crops of wattles that are reaped every seven or eight years off the same land.

The following paragraph from the article by Max Muspratt will be of interest: "It is across the Atlantic we must look for the best industrial development of wood distillation. In the United States vast tracts of virgin forest have been felled for this industry, but, unfortunately, replanting has not taken place, as the forest wealth seemed inexhaustible; now it is being gradually realised that the most accessible of the suitable timber has been used up

and every few years the workers have to be moved further and further from the centres of consumption. The situation is not yet acute from this point of view, but it is already giving cause for anxiety, and the world is watching keenly for some signs that the wood distillers are looking "ahead and taking steps to deal with the problem."

It will be understood that these notes are compiled from information somewhat hastily collected, and must be regarded only as a preliminary to further investigations. But the facts so far elicited are, I think, sufficiently encouraging to warrant the question being further pursued.

A show of South African products was held in the Municipal Hall at Rondebosch in the early part of this month. Amongst the numerous exhibits were South African eau-de-Cologne and breakfast oats, both of which, it is stated, compared well with the imported article.

A 1,200-pound steer, when dressed according to modern packing-house conditions, will yield, says the *National Provisioner* of Chicago, as follows:—Ribs, 165 lb.; loins, 115; round, 165; chunks, 150; plates, 113; shanks, 45; flanks, 24; suet, 28; kidneys, 2; tongue, 5; hide, 65; oleo oil, 25; oleo stearine, 13-20; tallow, 5-21; hair, 12; glue, 1-55; cheek, 5; brains, 5; lips, 1; heart, 3-5; liver, 10; tail, 1-25; sweetbreads, 2; medicinal glands, 6; tripe, 8; casing, 5-07; fertilizer, 24-75; hoofs, 1-75; shins, 1-5; neat's foot oil, 1; butter stock, 1-25; raw bone, 13; horns, .75; blood, 1-20; total, 881-56 lb. These figures are said by independent packers to be extremely conservative. The uses of the several parts are: Hides, leather. From tallow, soap, glycerine, butterine, lubricator and candles; from blood, albumen, fertilizer and stock food; from the hoofs, buttons, hair pins, fertilizer, glue and fancy goods; from the tankage, which includes all manner of "refuse," fertilizer and stock food; from oleo, oil, butterine and compound lard; from the intestines, sausage casings, gutskin for goldbeating purposes; from the weasands, sausage casings, brewers' hose and snuff packages; from the bladder, casings and packages for putty, lard, snuff; from the tail, hair for mattresses and upholstering; from the bones, buttons, glue, polish, leather dressing, lubricant and illuminant; from the bone meal, stock food, fertilizer, material for tempering steel, anhydrous ammonia and glue. The tongue, cheek, brain, lips, heart, liver, tail, sweetbreads and tripe are all sold for meat. There is nothing wasted but the water in the carcass.

Root Diseases of Sugar Cane.

IN recent years the root disease of sugar cane has commanded the notice of planters in the principal cane-producing regions of the world; and the loss from it has sometimes been serious. The disease is caused by the attacks of a fungus which has the power of living upon decaying vegetable matter in the soil, upon the dead parts of the cane plant, and parasitically in the tissues of the living cane roots. The fungus is known technically as *Marasmius sacchari* and belongs to the toadstool group. In common with other members of this group, it has a vegetable part, called the *mycelium*, which consists of a system of branching white threads and has the office of carrying on the nutritive processes of the fungus plant. Under proper conditions the *mycelium* produces the fruiting part of the fungus, the familiar cap-like toadstool, bearing the microscopic spores which serve, as do the seeds of higher plants, to propagate and distribute the organism.

Writing in the *Louisiana Planter*, Mr. H. R. Fulton, Plant Pathologist of the Louisiana State University Agricultural Experiment Stations, describes the nature of this disease and reviews the means that have been adopted or proposed for its control. He says that the *mycelium* of the sugar cane *Marasmius* is most prominent at the base of the stalk, where it grows between and in the old leaf sheaths, gluing them together in a very characteristic fashion. This matting may be slight, or it may extend for a foot or more from the surface of the ground; it is a distinctive indication of the presence of the root disease fungus. The shucks can be removed only with some difficulty, and the white mycelial growth is easily seen upon their surface. This is in marked contrast with the condition of unaffected canes, from which the shucks fall off clean. The mycelium of the fungus is also found in the roots of an affected stool. It gains an entrance here through the growing points of the young root-tips, and its presence results in the death of a greater or less portion of the root system of the cane plant. It is from this that the cane suffers. Because of the insufficiency of means for securing water and food elements, stools become dwarfed, and may be easily uprooted; and at the worst the plant dies. Naturally these ill effects are most marked during a period of drought, although the attack of the fungus may not be more active then than when more favourable conditions of moisture obtain.

Seasonal and other conditions unfavourable to the host plant always play an important part in determining the final outcome of the struggle for mastery between host and parasite. In keeping with this law is the observed fact that affected plant canes, as a rule, are only slightly

dwarfed and seldom killed, while stubble canes attracted by the fungus are much dwarfed and many stools are killed. The reasons, Mr. Fulton says, are these: (a) If the stool be affected as plant cane, the fungus survives the winter in the rich feeding ground afforded by the stump, and has a position of decided advantage when the new roots begin to push out in the spring; it has little trouble in entering the majority of these. (b) The early growth of stubble is slower and less vigorous than that of plant cane, which places them at a further disadvantage. (c) Stubble cane cannot be given the thorough cultivation possible for plant cane, and consequently the stools cannot, through the later more vigorous growth of such roots as may escape, compensate for the early ravages of the fungus. For reasons similar to 1 and 2, fall plant cane is apt to be affected to a greater extent than spring plant cane. Besides causing the death of roots, the fungus works further injury by smothering the buds which its mycelium surrounds.

The mycelium can exist on decaying vegetable matter in the soil, and it has the ability to spread through the soil by means of its ramifying threads. The spores probably play a less important part than the mycelium in the dissemination of this fungus. The toadstool fructifications are usually produced in wet weather, and near the base of the stalk on the outside of the matted leaf sheaths; they are white and small, the cap being three-eighths to one inch in diameter, and the stem having an equal length. These fruit bodies are essential for the exact determination of the fungus; we have found them in abundance in several parishes during the present season.

It is pointed out that other fungi besides *Marasmius sacchari* possibly cause root disease in sugar cane. Species from the stinkhorn group have been reported, including forms belonging to the genera *Mutinus* and *Clathrus*.

Mr. Fulton then proceeds to examine the various measures suggested for the

CONTROL OF THE DISEASE.

remarking that preventive measures are indirect and have to do largely with good cultural methods—that whatever tends to the production of strong and vigorous plants lessens by just so much the possibility of loss from parasite diseases. Among the various procedures he mentions the following:—

Selection of Sound Cane for Seed.—At planting time, under a system of rotation, a cane field is freer from the root fungus than at any other time during the three or four years period. To keep it free is important. The planting of affected canes, i.e., those having the leaves matted at the base, not only introduces the fungus throughout the field, but does it in such way that the plant stools readily become infected. This season he has had under observation on two plantations rows planted entirely with

affected canes in comparison with control rows planted with sound canes. In the former rows the stands are good, and the size is but little inferior to the control rows. In the case of one of these tests, in which four short rows were planted with whole affected stalks, and one row with the lower halves of affected stalks, i.e., the part having the fungus most abundant, a recent count gives the following percentages of present infection: For the four rows, 89 per cent. of the stools, and 61 per cent. of the individual canes; for the single row, 100 per cent. of the stools, and 91 per cent. of the canes. The five control rows have, all told, one affected stool, with two canes showing the fungus. The effect upon the stubble crops is awaited with interest. The practice of using stubble canes for seed is likely to result in more infection than that of using plant canes, because stubbles usually have a much larger percentage of affected stalks than plants.

As a preventive measure of first importance we would emphasise the use of sound cane only for planting purposes, and this is to be secured by careful inspection to see that no evidently diseased stalks are used. The root disease presents a characteristic appearance, and can be readily recognised in most instances. The discarding of diseased stalks should take place before windrowing to avoid spread of the fungus in the trash of the windrows, and to allow grinding of affected canes.

Disinfection of Seed Cane.—It has been suggested that soaking seed canes in a fungicidal solution, such as Bordeaux mixture, be practiced. Such a procedure has proved successful in an experimental way in the West Indies, in Java, and in Hawaii; in some regions it has been carried on successfully on a plantation scale, and the practice is increasing. The usefulness and practicability of it, however, require testing under Natal conditions.

Disinfection of the Soil.—The root fungus is largely a soil-inhabiting organism. A certain amount of it lives over from year to year in the decaying organic matter of the soil. Attempts to disinfect large areas by applying fungicides to the soil have usually been unsuccessful. It is possible, however, that the use of lime for its fungicidal effect on badly infected land might accomplish some good. Ploughing the land so as to expose the mycelium to sunlight and air will destroy much of the fungus.

Destruction of Infected Trash.—Burning the trash and thorough removal of old cane stumps will have a good effect in reducing the amount of the fungus in the fields.

Cultivation.—In combating any parasitic disease those measures that promote the vigorous growth of the host plant, increase its powers of resistance, and are of utmost value. Especially are such measures important in the case of the root disease of sugar cane, where the balance is rather even, and the least advantage to one or the other competitor counts for so much in the final outcome of the struggle. The tillage and culti-

vation that are possible with plant cane seem adequate under normal conditions. With stubbles the case is different. Always the object should be to secure such pulverization of the soil about stubbles as will promote the early and vigorous growth of the buds and the fullest possible development of the root system.

Irrigation.—Where it has been possible to employ irrigation as a means of combating the root fungus, the results have been most gratifying. Root disease is at its worst when there is a deficiency of moisture, for reasons already indicated; and irrigation corrects the unfavourable condition.

The Stubble Crop.—In these cases where the plant canes are very badly affected with the root fungus, the question arises whether it will be profitable to attempt a stubble crop. It can be safely predicted that the stubbles will be much worse affected than the plant crop. How much worse, and what the margin of difference will be, depend too much upon future conditions to be foretold. Whether such early removal of cane from the land would have a decidedly beneficial effect upon a succeeding plant crop would depend more upon the intervening treatment of the land than upon the mere removal of the canes.

Resting Land for Cane.—The usual rotation of cane with corn and cowpeas gives one year in non-susceptible crops, and tends to decrease the root fungus. There is need for more exact knowledge regarding the value in cases of extreme infection of keeping cane off the land for a longer period of years.

Drainage.—On badly drained lands the cane plants are at a disadvantage which the root fungus is ever ready to make the most of. On such lands, especially when in stubble, the matted condition of the stalks indicative of the disease is very much in evidence.

The analysis of the sweet potato is as follows:—100 lb. sweet potato contains 69.32 to 73.11 lb. water, 1.09 to 1.29 lb. ash, 1.38 to 2.47 protein or flesh-forming material, 0.86 to 1.23 lb. fibre, 29.73 to 28.46 nitrogen free extract (starch, sugar, gum, etc.), and 0.43 to 0.85 lb. fat; a total of 27.46 lb. to 32.49 lb. dry matter. It thus contains more dry matter and more starchy and sugary food, but less nitrogenous material than the ordinary potato. As a comparison it may be stated that 100 lb. maize contains 89.1 dry matter, 10.5 protein, and 75 lb. nitrogen free extract, while 300 lb. sweet potatoes contain 86.7 dry matter, 4.5 lb. protein, and 75.3 lb. nitrogen free extract.

Instructions for Taking Samples for Analysis.

By ALEX. PARDY, F.C.S., etc., Analyst.

SOILS.

IN the first place take a general survey of the land and note any peculiarities of the field as to its slope, size, general formation and as to the uniformity of the soil; then decide the localities from which samples should be obtained.

Next take a thoroughly clean wheelbarrow, a clean spade, a clean sack (preferably a new one), several small wooden boxes or canvas bags and a notebook.

If the soil is found to be of a uniform nature, or without marked variation, then sub-samples may at once be taken from four, five or more places throughout the area but avoiding headlands, proximity to roads, trees and such like so that a characteristic sample of the cultivable parts of the field may be secured. Should the soil be found to vary in parts, it may be as well then to take sub-samples of that kind of soil only which represents the greater portion of the field. If the areas are considerable then separate sub-samples will be necessary from each part so that only the soils resembling each other may be mixed together.

Having selected a spot, proceed by pulling up or removing any surface vegetation. Then dig a hole from two to three feet deep; cut away the soil so as to leave a block the width of the spade standing out from the side to the centre of the hole; pare the sides so that they shall be clean and vertical; place the sack flat down in the hole; then with the spade take a clean cut down and allow the section to fall into the sack. The sub-soil is taken in the same way after the top soil has been removed and must be kept quite separate. Take a number of sub-samples in this way, and mix those of a kind thoroughly together in the wheelbarrow. Take 5 or 6 lbs. of the mixture, parcel it up in the box or bag, then number and label it so that it may be referred to again in the report.

Carefully note down the appearance of the soil and subsoil, the depth at which a change of colour, if any, is visible, and the depth to which roots have penetrated. If a line of demarcation is not possible between the surface and subsoils, then take the first nine inches as being the surface soil, and from nine inches to eighteen or twenty-four inches as the subsoil. Each sub-sample should be taken to as uniform a depth as possible.

Pack the samples together and keep in a clean, dry place preparatory to despatch. Then address carriage paid to the Analyst, Central Experiment Farm, Cedara, together with a description and rough plan of the

field showing the spots where the samples were selected and indicating the slope, aspect, and proximity of spruits or water courses.

State whether the land is virgin or cultivated; if the former, whether under bush or grass; if the latter, how long it has been under cultivation, to what crops, and the nature of the last crop produced, together with the general results of such crops. State whether any manure has been applied—when, what sort, and how much to the acre; whether the land is naturally or artificially drained, and if the drainage is good; also the behaviour of the land in wet or dry seasons. Give all details possible as to the characteristics of the soil; and, where advice in manuring is sought, specify what crop it is intended to plant.

MANURES.

It is of the first importance that sampling should be done with care and judgment, so that the small portion secured may faithfully represent the bulk from which it is taken.

Proceed by selecting four, five, or more, bags from the consignment and emptying each one out separately on a clean floor. Work each heap up thoroughly with the spade, then take a spadeful of each and place together in one lot, subsequently working the portion so obtained until it forms a thoroughly uniform mixture. Divide the mixture into four parts; take one of the parts and subject it to further mixing, at the same time breaking down any lumps with the hands to ensure thorough incorporation. Take about 1 lb. for the sample, place it in a wide-necked bottle and cork up tightly so that no loss of moisture may take place.

When a sample is required for analysis to confirm the terms of a purchase, the seller or his agent should be sufficiently notified of this purpose, so that he, his agent or appointed witness may be present during the picking and sealing up of the samples. The portions selected should at once be placed in bottles, sealed up, one or more handed to the seller, one retained by the purchaser, and one sent to the Analyst for examination.

FEEDING STUFFS.

Samples of loose stock foods should be obtained in a similar way to that of manures.

Cake samples may be taken across, or from the middle of several cakes after they have been broken in halves, or a rough tooth saw may be run longitudinally through the cakes and the sawings taken as the sample. About half a pound of the mixed material so obtained should be placed in a clean glass bottle and tightly corked.

Instructions as to special sampling and the selection of vegetable products, water and such like may be had on application to the Analyst.

REMARKS.

Samples should be forwarded prepaid to the Analyst, Central Experiment Farm, Cedara, and be accompanied by a letter giving full details as to the nature of the material and the name and address of the sender.

Each sample should carry both inside and outside the cover the name of the sender; and if more than one sample be placed under the same cover a distinctive number or letter should be placed on each to correspond with that in the note of advice. Only samples which conform to these requirements will be dealt with.

It is advisable that soil samples should be forwarded a few weeks before the results of the examination are required in order to allow of the necessary time to deal with them.

SCHEDULE OF FEES.

The following scales of charges apply to analysis performed at the Laboratories, Central Experiment Farm, Cedara:—

	Scale I.	Scale II.
	£ s. d.	£ s. d.
FERTILIZERS AND FEEDING STUFFS:		
Determination of 1 constituent ...	0 7 6	0 5 0
" 2 or 3 constituents ...	0 15 0	0 10 0
Complete analysis ...	1 1 0	0 15 0
SOILS: Partial analysis of a soil in relation to its fertility ...	1 1 0	0 10 6
Complete analysis of a soil ...	2 2 0	1 1 0
WATER: Irrigation and drainage ...	1 10 0	0 10 6
VEGETABLE PRODUCE: Fodders, Ensilage, Grains, &c. ...	1 1 0	0 15 0
MILK, CREAM, BUTTER: Fat only ...	0 5 0	0 2 6
" " : Complete ...	0 15 0	0 7 6
WATTLE BARKS AND TEA: Tannin ...	0 5 0	0 2 6
CATTLE DIPS: Quantitative analysis of 1 to 3 principal constituents ...	0 10 0	0 5 0
INSECTICIDES:		
Qualitative analysis each constituent ...	0 5 0	0 2 6
Quantitative " " " ...	0 10 6	0 5 0

Scale No. 1 is applicable to samples handed in by Merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Department, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Department to remit any charges made hereunder.

Among the essentials of successful butter-making, are clean milk, producing rich cream, and cleanly handling of the cream at low temperatures and its prompt conversion into butter.

East Coast Fever.

RECENT REGULATIONS AND RESTRICTIONS.

IN terms of Section 3 of Act No. 54, 1906 (East Coast Fever), the Minister of Agriculture has declared that portion of the Magisterial Division of the City of Pietermaritzburg and that portion of the Magisterial Division of Umgeni lying to the east of the main line of railway, each to be an infected area within the meaning of the Act, and the ingress or egress of cattle into or from and the movement of cattle within these infected areas, have been prohibited. Notwithstanding this prohibition, the removal of slaughter cattle only may be allowed on permission in writing being first obtained from the Chief of the Veterinary Division of the Department of Agriculture, subject to such conditions as he may impose.

Another infected area has been formed comprising that portion of the Magisterial Divisions of the City of Pietermaritzburg and Umgeni lying to the west of the railway, and the ingress or egress of cattle into or from and the movement of cattle within this area have been prohibited. Notwithstanding this prohibition, however, healthy cattle may be moved within the area in question on permission being first obtained from the local District Veterinary Surgeon or Stock Inspector, such permission being subject to any conditions which the issuing officer may see fit to impose.

The Magisterial Divisions of Ixopo and Richmond have also been declared each a separate infected area (Government Notices 703 and 704, respectively), and the ingress or egress of cattle into or from and the movement of cattle within these areas have been prohibited. The movement of healthy cattle within either of these areas will, however, be allowed on written permission being first obtained from a member of the Local Committee appointed to issue such permits, or from the local District Veterinary Surgeon or Stock Inspector.

All permits issued for the removal of cattle in districts quarantined under Section 3 of the East Coast Fever Act of 1906 must be on the authorised form of permit as supplied by Government. Any cattle found moving without such authorised permit will be dealt with under the Act.

REMOVAL OF CATTLE FOR SLAUGHTER.

Public notification has been made to the effect that permits for the removal of cattle for slaughter from infected areas or adjacent places under Act No. 8, 1907, will in future be issued only by the Minister of Agriculture.

Inasmuch as the Act limits the right of an owner who has received notice of the Government's intention to dispose of cattle for slaughter, to the private disposal for slaughter of the whole of such cattle within one week after receiving the notice, no permits are to be granted unless the Minister is in each case satisfied that there has not been any infringement of the terms of the Act.

The Apricot as a Market Fruit.

SUMMER PRUNING OF THE TREES.

THE beginning of December saw the appearance of the first lots of apricots in the fruit stores of the Colony. The cultivation of this excellent fruit, in common with that of most of our deciduous fruits, has received little attention in this country—which fact is much to be wondered at, considering the suitability of the fruit to the country and its popular favour both for eating in the fresh form and for preserves. Were proper attention given to the cultivation of the trees and to the marketing of the fruit, we feel sure that those who have apricot trees in their orchards that are at present yielding no returns worth speaking of, would soon be rewarded for any trouble they might expend.

Apricots, like peaches, are picked as soon as they show the first traces of ripening. The well-trained picker tests each fruit by taking it between his thumb and fingers and feeling it with the ball of his thumb. The fruit is not squeezed or bruised; but if it has the faintest feeling of mellowness its time has come, and the picker transfers it to his basket.

Then comes the operation of grading—a most important operation, the neglect of which in the past has done much to hamper the progress of the local fruit trade. Grading is something that cannot be overdone. The more rigid the grading the better it pays. The greatest care should be given to the sorting of fruit; and it is also advisable to give full consideration to the question of packages. Clean, uniform fruit, neatly packed in new, labelled boxes, must always command the highest prices. An intending purchaser is generally willing to pay more for such a box of fruit than for so many pounds of fruit of all sizes and appearances, for the reason that he knows he is buying good, presentable fruit right through, whereas in the other case he is not sure as to precisely what he is getting. It has, in fact, been proved over and over again, by actual experience, that grading tells; and the proper sorting and packing of fruit for market are matters that are now given full attention to in all progressive countries.

SUMMER PRUNING.

Recently Mr. W. A. Boucher was sent to California by the New Zealand Department of Agriculture for the purpose of reporting upon the methods of fruit culture and marketing followed in that country; and in his report he gives some interesting facts on the pruning of the apricot. In that country, he says, the pruning of the apricot differs materially

from that of other deciduous fruits, as, in order to obtain the best results, severe summer pruning is necessary. The apricot is naturally a very vigorous tree, and if allowed to grow unchecked soon becomes unmanageable in size, both for the gathering of the fruit and for spraying. With the usual tendency of such trees it produces fruit of inferior size at the extremities of the twigs, where it is not easily reached. The main object which is desired and accomplished by summer pruning, Mr. Boucher states, is the production of fruit buds and spurs along the main limbs of the trees and on strong, well-ripened growth. Unchecked, the vigorous, rapidly-growing twigs draw the sap to themselves, producing, late in the season, fruit-buds towards their extremities, and starving the fruit-spurs that may have been formed, so that if the pruning be left until the winter either a large proportion of the bearing wood for the next season must be sacrificed in the cutting-back, and with it a large proportion of the crop, or, this wood being left to carry the fruit, the tree soon grows to be unmanageable in both height and diameter, and the fruit inferior in size. In the summer pruning of the apricot, which is carried out as soon as the crop has been gathered, all growth of the season is cut back to from 6 in. to 1 in. from the point where it commenced to grow in the spring. The effect of this severe summer pruning is to concentrate the sap, which otherwise would flow to produce much non-bearing useless wood, in the main limbs and short lengths of the season's growth that are left, with a result that strong spurs, with full, plump blossom-buds, are formed, and many buds that in unpruned trees would be barren develop into strong blossom-buds, which bear fruit the following season.

Mr. Boucher recommends summer pruning in a modified form for other deciduous fruits, especially strong-growing peaches, pears, plums, and apples, many varieties of which, when they are young, have a tendency to run rapidly into wood without the production of fruit buds or spurs. If the tendency to grow long, willowy shoots is checked by judicious summer pruning, the sap, instead of flowing to produce a useless growth that must be cut away with the winter pruning, produces strong well-ripened wood, with plump, strong fruit-buds. Young trees may be induced to bear at a much earlier period than they would otherwise, and, once bearing, the growth becomes less rank, giving less trouble at both the summer and the winter pruning.

The apricot should be budded on seedling apricots, and on peach and plum stocks. Plum stocks are preferred, and are more especially adapted to heavy soils; on light soils the hard-shelled almond and the wild plum have proved excellent. The soil should be deep and dry. Young trees have frequently perished from a wet subsoil, even when the surface is not unusually moist. On suitable soils the tree is as hardy as most early peaches.

The Influence of Frost on Tick Life.

By F. A. VERNEY, F.R.C.V.S.

WITH an ever-increasing knowledge of the important role that ticks play in transmitting many of the South African animal diseases, I thought it would be of interest to ascertain what part extreme cold played as a factor in controlling the increase of these parasites, and especially what part it played (if any) in the destroying of the life cycle of ticks, as we now know that in certain diseases (East Coast Fever, biliary fever, malignant jaundice, etc.) it is only at certain stages of the tick life that it can become infective. For instance, in the case of an adult female brown tick that has fed on an East Coast Fever animal and then lays eggs, the larvae from these eggs are not able to transmit the disease, the poroplasma not being able to pass through the egg stage, but should one of these larvae feed on an East Coast Fever animal and drop off and successfully moult, then at the next stage of its existence (nymph) it is able to transmit East Coast Fever to a susceptible animal.

Residing at Mooi River, I was in a particularly favourable spot to test the effect of cold on tick life, for Mooi River is recognised to be one of the coldest places in Natal and probably in South Africa; and when one knows that the thermometer on the banks of the Mooi River can change in 12 hours from 64 degrees F. to 4 degrees F. there can be no challenging the veracity of this statement. During the last winter we experienced one of the coldest winters on record, and this was very favourable to my experiments.

In giving ticks exposure to frost I placed them in dishes, which were filled for two-thirds of their depth with very fine earth, which I put in to enable the ticks to burrow, and so put the test as near natural conditions as possible. My own observations of ticks dropping off animals in the winter show that they try to find the most sheltered places, such as under stones, in small holes and under tufts of grass. During the winter I put several engorged female ticks out in my garden, which consisted of well-dug earth, and on every occasion next morning I had no difficulty in finding them. I must say I was greatly disappointed in them as burrowers, but this is, perhaps, not surprising when one thinks of their anatomical formation, which is certainly not conducive to getting underground.

Experiment 1.—Put out 2 red male adults, 3 nymphal blue, 1 engorged female blue. Frost, 9 degs. No deaths.

Experiment 2.—Put out 3 nymphal blue, 3 male red, 1 engorged

female brown adult, 1 male bont. Frost, 16 degs. All ticks had burrowed and all were dead.

Experiment 3.—Put out 1 bont male adult, 1 bont leg male adult, 3 brown male adults. Frost, 15 degs. All dead except 1 brown tick, male.

Experiment 4.—Put out surviving brown tick from Ex. 3, and one bont leg male adult. Frost, 13 degs. Brown tick dead, bont leg alive.

Experiment 5.—Put out surviving bont leg (Ex. 4). Frost, 9 degs. Alive.

Experiment 6.—Put out bont leg again. Frost, 16 degs. Dead.

Experiment 7.—Put out 3 male blue, 3 engorged female blue, 8 nymphal blue. Frost, 16 degs. All dead except one male blue.

Experiment 8.—Put out surviving male blue (Ex. 7). Frost, 12 degs. Dead.

Experiment 9.—Put out 3 engorged female blue. These were subjected to five consecutive nights of frost, varying from 10 degs. to 18 degs. All dead and had an exceedingly shrivelled up appearance.

Experiment 10.—Put out 2 male red, 1 female red, 1 male brown, 4 nymphal brown. Frost, 8 degs. All alive.

Experiment 11.—Put out all ticks of Experiment 10, and 20 nymphal red ticks. Subjected to four frosts of 6 degs., 11 degs., 4 degs., 6 degs. All alive except 1 red male.

Experiment 12.—Put out surviving ticks of Experiment 11, and subjected them to two frosts of 12 degs. and 16 degs. All dead except 1 red female and 20 nymphal red. These ticks were further subjected to two frosts of 11 degs. and 21 degs., which killed them all.

Experiment 13.—Put out 18 nymphal brown ticks. Frost, 18 degs. Fourteen dead, 4 alive. Remaining 4 ticks were subjected to two frosts of 4 degs. and 11 degs. All dead.

Experiment 14.—Put out 20 larval brown ticks. Subjected to four nights of frost of 16 degs., 4 degs., 11 degs., 12 degs. All dead.

Experiment 15.—Put out 1 engorged female blue. Frost, 16 degs. Alive. Subjected to two nights frost, 4 degs., 11 degs. Dead.

Experiment 16.—Put out 9 nymphal brown ticks, which were subjected to three nights of frost of 16 degs., 19 degs., 13 degs. Eight dead, 1 alive. Surviving tick was killed by next frost of 13 degs.

Experiment 17.—Put out 28 larval brown ticks, which were subjected to three nights of frost of 16 degs., 19 degs., 13 degs. Twenty-seven were dead, 1 alive. Next night's frost of 13 degs. killed this surviving tick.

Experiment 18.—Eggs of blue tick subjected throughout the winter to frost proved fertile on incubation.

From the experiments it is easily seen that frosts do play a very important part in killing tick life, and, no doubt, this is in the main the reason why the high veld of Natal has never been so tick infected as the lower altitudes, nor is it likely that these high lands will ever

be so, notwithstanding the fact that at certain seasons of the year large quantities of ticks are brought into the high veld by transport and other animals.

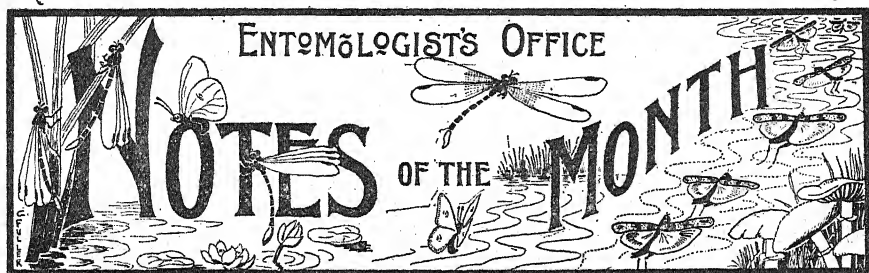
It will be noticed, in reviewing these experiments, that it is the succession of heavy frosts that act as tick killers, rather than an individual heavy frost, and it is surprising to find what a large amount of frost ticks can withstand for one night only, only to die if they are subjected to two or three or more successive nights of heavy frost.

Frosts of less than 10 degrees appear to have very little ill effect on tick life, even if they are successive. Experiment 11 illustrates this, and it is very doubtful if ticks residing in the middle veld and thorns ever become subjected to greater frosts than existed in this experiment.

Experiments 11, 12, 13, 14, 16, 17 are especially interesting, in view of our knowledge of the part that the brown and red ticks play in East Coast Fever.

These experiments probably furnish the reason why East Coast Fever when having been introduced on to the high veld has eventually died out. Unfortunately for Natal the amount of such high veld, with frosts to the degree that I obtained in these experiments is very limited, and only exists on farms in the Mooi River, Impendhle and Polela districts that are free from bush, wattle plantations and other trees. Farms on the high veld with natural bush upon them afford excellent cover to moulting ticks, and even in the depths of winter I have seen larval and brown ticks on the cattle running on such farms. I am certainly of the opinion that East Coast Fever would flourish exceedingly well all the year round on all our high veld farms on which plenty of bush exists. It is to be regretted that Experiment 18 was not positive, for if a number of heavy frosts would only destroy the fertility of the eggs then we should easily be able to keep our high veld farms free of ticks. This explains the fact that when a farm becomes infected with ordinary red-water, the disease must be expected next summer, for the simple reason that in this disease the causal parasite is able to pass through the egg stage.

The Colonial Secretary of the Transvaal has received intimation from the Rhodesian Authorities to the effect that there is little hope of persons without a definite trade finding employment in Southern Rhodesia, and that it is unwise for miners and others to go to Rhodesian territory at the present time unless they have work guaranteed them.



Locusts in November.

THE position and movements of locusts throughout the Colony during November are shown in the accompanying table. O represents circling swarms, moving around district.

Date.	Locality.	Position.	Flight to—
1st	Umtwalumi	Pairing, laying ...	O
	Noodsberg		E
2nd	Mehlomnyama	District free	
	Mapumulo		E & S E
	Mt. Edgecombe	Settled	
	Subaesa's Location, Umvoti V.	Laying	
	Ematimatolo, Umvoti Valley ...	do	
	Tongaat Police		Nil
	Ingwavuma		Nil
	Hlabisa	Five layings	
3rd	Hlimbitwa and Umubi	Laying	
	Impendhle		Nil
	Ndumu		Nil
4th	Port Shepstone	Great flight for two days ...	S
	Stanger		E
	Equeefa		E
	Imbizane	Settled	
	do	Swarm 4 miles broad ...	S W
5th	Seven Oaks	Laying	
	Buxedeni, Nongoma	do	
	Great Noodsberg	Laying in Location ...	
	Umtamvuna	Settled	
6th	Eshowe	Flying against wind ...	S

Date.	Locality.	Position.	Flight to—
7th	Krantzkop (Hlwane) ...	Laying ...	S E
	Equeefa ...	...
	Rosebank (Richmond) ...	Laying ...	
	Near Umkomaas (Richmond)...	do ...	Nil
	Mapumulo ..	do ...	
	Imbizane ...	Settled ...	
8th	Mseleni ...	...	Nil
	Umtwalumi ...	Laying ...	
	Mdingazwe's Location, near Noodsberg	do ...	
	M'dinge's Location ...	do ..	
9th	Hlatikulu ...	Settled ...	N
	Avoca ...	...
	Tonga Police ...	...	Nil
	Tonga Beach ...	Laying ...	
	Murchison ...	Extending 8 miles from Coast	N
	Mehlomnyama ...	...
10th	Babanango Police ...	...	O
	Darnall ...	Small swarm ...	Nil
	Impendhle ...	...	N E
	Murchison ...	...	Nil
	Hermansberg ...	...	O
	Lower Tugela ...	Laying for 8 days past ...	Nil
14th	Equeefa ...	...	E
	Tshulshutshwa's Location ...	Laying ...	Nil
	N'Tabankulu ...	...
	Umvoti Mission R. ...	Laying ...	Nil
	New Germany ...	do ...	
	Wyebank ...	do ...	
15th	Marianhill ...	do ...	
	Northdene ...	do ...	
	Ekutandaneni ...	do ...	
	Isipofu ...	...
	Mseleni ...	...	Nil
	Impendhle ...	...	"
16th	Mehlomnyama ...	...	"
	Mt. Edgecombe ...	Laying ...	N & S
	Tonga Beach ...	do ...	
	Darnall ...	do ...	
	Mtunzini ...	Hoppers ...	Nil
	Babanango ...	...
17th	Glendale ...	...
	Umvoti Valley ...	Laying ...	S E
21st	Mseleni ...	...	Nil
22nd	Ndwedwe ...	Two swarms settled ...	
	Darnall ...	Hoppers ...	Nil
23rd	Eshowe ...	do ...	
	Verulam ...	do ...	

Date.	Locality.			Position.			Flight to—
23rd	Mehlomnyama	...	...	Settled	...	...	Nil
	Mt. Edgecombe	...	...	Laying	...	...
	Nqutu	...	...		
25th	Impendhle	...	...				"
	N'Tabankulu	...	...				"
27th	Ginginhlovo	...	...	Hoppers	...	...
	Umtwalumi	...	...	Laying	...	...
30th	Avoca	...	...	Hoppers	...	...	Nil
	Impendhle	...	...		
	Nqutu	...	...		



LADYBIRDS.

A correspondent living near Estecourt wrote to this office towards the end of November with regard to certain insects—which he thought were ladybirds—that appeared to do a great deal of damage in the early spring to young cucumbers, melons, etc., and asked whether it was advisable to destroy them. He sent some specimens, with his letter, for identification.

The specimens sent comprised three distinct species. Two were true ladybirds belonging to the *Epilachnidae* and represented the phytophagus branch of an otherwise carnivorous—and therefore useful—group of insects. These were the rounded, tortoise-like species.

The other creature was not a ladybird—though from its black and yellow colouration and size it is popularly supposed to be. This pseudo-ladybird has entirely different habits from the true ladybird; and it may be stated at once that its life-history has never been ascertained. There is no doubt, however, that the female deposits her eggs in the ground, and that the young grubs feed upon the roots of grass or herbage. We have made many efforts, both in Australia and here, to solve the riddle of this little creature's pre-adult existence, but have never been so fortunate as to ascertain its solution with any exactitude. The pest is partial to the flowers of all the melon and pumpkin tribe, and has many allied forms in many other parts of the world.

Upon the other hand, the life-cycle of the ladybird and its development from egg to adult is easily observed. The eggs are fairly conspicuous, ovoid, yellow objects laid on end in clusters of ten or more upon the under surface of the leaves. From these emerge grub-like

creatures, well clothed, with remarkably branched black spines which stand erect upon the back like the quills of a scared or angered hedgehog. Like the adults, these grubs feed upon the leaves, skeletonising them.

Upon reaching maturity they glue themselves down upon the under surface of the leaves, the skin is ruptured along the medium line of the back and, opening out, the chrysalid or pupa is revealed. Half hidden, half protected by the larval skin, the pupa remains quiescent for some days, and then, on the rupturing of its skin, the adult beetle emerges.

There are only two suggestions which can be made with regard to the treatment of these pests. The one is to spray the plants with Swift's arsenate of lead, for preference—in the proportion of 1 lb. to 50 gallons of water; the other is to protect the plants from attack by netting them over. This may seem a troublesome thing to do, but it is a suggestion that we have seen carried out with such success that large cucumber growers have frames properly made, which they use season after season against the attacks of insects such as those under discussion. To cover the plants as a temporary expedient, two pliable sticks pointed at either end are required. These are crossed at right angles and bent over the hills as arches. They are then covered with fruit-fly netting, such as is obtainable in Maritzburg at 12s. 6d. the piece—40 yards by 72 inches.

We regard the spraying as the preferable treatment for the leaf-eating ladybirds, and the covering for the flower-eating beetles, which we have referred to as pseudo-ladybirds.



FRUIT PEST PARASITES.

Parasites for the purpose of destroying scale and other pests on fruit have been tried in various ways in California for the last twenty years; and reports have from time to time got abroad indicating that successful results have been obtained from the introduction of these parasites. In order to ascertain the degree of accuracy of these reports, Mr. W. W. Froggatt, the Government Entomologist of New South Wales, was specially commissioned recently by his Government to proceed to California to inquire into the actual state of things there. Mr. Froggatt has found that in the laboratory these parasites work with satisfactory results, but that in the orchards they are apparently a failure. In the course of a report which he has submitted to the N.S.W. Minister for Agriculture, he says, with reference to these parasites: "The contention that where parasites were introduced it would not be necessary to take any mechanical methods to destroy insect pests is certainly not borne out by the present conditions of orcharding and orchards in California. There is no question that the native, and not the introduced chalcid wasps, para-

sites are doing as much work in devouring the percentage of scale insects that are their natural food, but as for either native or introduced parasites exterminating a pest when once it is firmly established, it has never happened yet."

Summing up, Mr. Froggatt says: "The observations made during my three-weeks' investigations among the insect pests of the orchards, and as to the value of parasites, and the opinions of the leading men interested in the industry, all point to the same conclusions, namely, that in spite of the money and work that have been expended during the last twenty years in the State of California upon the introduction and propagation of foreign parasitic insects to destroy scale and other injurious insects, with one or two exceptions they have very little commercial value, for unless they are effective enough to render the work of spraying and fumigation unnecessary, they might as well not exist."



THE CODLING MOTH.

It is not my intention to increase the already large number of treatises on this pest by another, but just to quote some notes on a consignment of apples, which showed marks of the moth.

In April I had to examine about 160 cases of apples from Adelaide (South Australia). The first case I opened showed signs that the apples were attacked by some insect. On cutting them in half the peculiar furrows made by the codling moth were plainly visible, but in about a hundred apples treated in this way I was not able to find one live caterpillar. At the same time, I found the hole through which the grub had made its escape. These apples were not wrapped in paper, but packed in "wood-wool." In searching the latter I detected a large number of cocoons, which held the wool together in lumps. At the same time, several caterpillars had located themselves in the corners of the boxes and eaten away part of the wood to find material with which to make their cocoons. Some cocoons contained pupa, but most of them enclosed caterpillars. I collected sufficient material for breeding purposes, and had the apples and boxes burnt under my personal supervision. I sorted the material for breeding, and put all the cocoons in two large glass jars with net covers. The remaining wood-wool I put in two other glass jars, covered in the same way. A few moths emerged about a week later out of the first-named jars, but only 8 out of more than 100 cocoons, which I found later had nearly all died on account of the sand in the glasses being too wet. From time to time I inspected all the jars, but not seeing any moths emerging, I left them on a corner of my table, intending to empty and use them for breeding other insects, but this was delayed

and never done. Early in August I happened to look at the glasses again, and found in the ones which contained but the wood-wool two dead codling moths, and, on closer inspection, one moth alive, and in perfect condition. My interest being naturally re-awakened, I did not omit to search every day for more, and I was able to find 15 more moths during the next few days. Thus the jars from which I had not expected any moths provided me with 18 well-developed insects, of which 5 were males and 13 females. The latter were all full of eggs. Three of these I dissected, and found in one 34; in the two others 48 and 65 eggs respectively. But I am inclined to think that I counted less than really existed, my magnifying-glass being not powerful enough.

I killed the moths as soon as they were noticed. In the jars the moths always kept themselves hidden in a dark corner away from the light; they were therefore not easy to detect at once.

This experiment shows the great danger of introducing the moths by the packing of the apples, when no care is exercised to burn the papers or wood-wool in which the fruit was packed, as also to use the old boxes again and again.

In the same consignment I found the larva of another moth. Being an external feeder and not living as the codling moth inside the fruit, its presence was easily detected. It attacks the skin of the apple, and eats away long open furrows; sometimes the caterpillar had also made a hole in the flower end or calix of the apple, and lined this with a fine silken web. This served as its retreat, and from there it came out to feed on the skin. Badly infested apples had whole patches of the skin eaten away. On these patches decay soon sets in, and the apple rots away. When the caterpillar was disturbed it walked forward or backward in a very quick way, and dropped from the apple on a thin silken thread, by which means it climbed again on to the fruit when left alone. The pupa were also found in the corner of the boxes or between the enveloping papers and the apples, but were not enclosed in a strong cocoon, but in a very light web of white silky appearance. When the moths emerged from specimens which I had put in my breeding-box they proved to be *Caecocia postvittana*, which does great damage to apples in Australia. This moth was present in a number of cases, not only from Adelaide, but also from Victoria and Tasmania. I recently discovered the same in a dozen apples which were sent from England by parcels post. One of these was marked in the peculiar manner above stated, and the live caterpillar (a young one) was in the paper in which the apple was wrapped.

H. VON P. BERENBERG.



MOTH CATERPILLAR ATTACKING NATIVE PALM.

Inspecting a nursery near Seacow Lake, about two miles from Umgeni, I noticed that some native palms (*Phoenix reclinata*, Jacq) showed signs of a disease, or of the attack of an insect. On closer inspection, I found in the heart of the plant, in the leaf spike, an accumulation of chips, fibres and excrement, which led me to conclude some insect was present. I succeeded in extracting from one of the palms a live larva, which proved to be the caterpillar of a moth. Being new to me, I decided to breed the insect in captivity so as to make sure of its nature. The creature was little over one inch in length, and was taken from a depth of about from 2 to 3 inches in the axis of the leaves. Having nothing but an empty matchbox I put the larva with some of the extracted bits into it, and took it home. I observed that the same evening it made preparations to spin, and therefore placed it in a larger box. Here it began to spin in one of the corners of the box, and with the bits of fibre enclosed itself in a cocoon. This process was finished in about two days. The caterpillar must have been full grown when I happened to dislodge it from its natural haunt.

In a nursery at Umbilo I heard complaints about a grub eating the inside of the native palms, and came to the conclusion that it must be the same as that which I found at Seacow Lake; and as this proved to be the case, I tried to obtain as many specimens as possible. Helped by the gardener, I collected altogether three dozen larvae, of all sizes from a quarter of an inch to an inch long. Unfortunately I have not been able to breed a single one of the whole lot, so that it is from the first capture that I give this description.

The owners of both nurseries were much troubled by the pest, and attribute the loss of many palms to it.

Having found the caterpillars in all stages inside the palms, I do not think I am wrong in stating that the female moth must deposit her eggs anywhere on the inside of the base of the leaves, from where the larvae as soon as hatched begin to eat off the skin and feed on the base of the leaf.

I have not noticed any difference in colour or shape in any of the three dozen larvae found. Those only a quarter of an inch in length were similar to the larger ones of one inch in all respects except as regards size.

The moth is inclined to hide away on dark objects. When I inspected my breeding-box I noticed that the moth had emerged from the cocoon, but was at first unable to detect it. After a thorough search, however, I found it sitting on the underside of a dead *Bundea caffraria* (Saturnid moth), which was left in the same box, and well on such part of the wing as blended exactly with the colour of the live insect I was looking for. This struck me as very protective.

Amongst my numerous captures of small moths (about 600 different kinds, collected around the electric arc-lights at Durban) I have not come across the micro just described, which leads me to believe that the moth is not attracted by light, which will render its capture and destruction more difficult, and reduces the possibility of exterminating or checking this pest by sprayings with some poisonous material, or to handpicking. The grub being easily detected by the accumulation of chips of fibre and excrements around the entrance of the furrow, a look out for the insect will be required, and the caterpillar has to be extracted and killed. This extraction will always injure the leaves in question, but save the palm as a whole. Insecticides will not be applicable, I am afraid. In the first place, they will not reach the larvae, and as regards liquid poisons, they may do more harm in remaining between the shoots in the base, and causing the palm to rot at this place.

H. von P. B.



Fibre in Mauritius.

ADVICE has been received by the Department of Agriculture, from the Director of the Department of Forests and Gardens, Mauritius, of the despatch of a small consignment of bulbils of *Furcraea gigantea*. The Director states, in his letter, that any quantity of bulbils can be obtained from his Department at the rate of 15 rupees per thousand bulbils of two years of age and 10 rupees per thousand of one year, f.o.b.

In a memorandum on the subject of the Mauritius fibre industry, the Director states that the leaves of the aloe can be cut about four years after the plants are laid out. Ten months later a second crop is obtained, fifteen months after a third, a fourth eighteen months after, and so on every eighteen months until the aloe plant sends up its shoot or pole—which bears bulbils in great quantities for reproduction—after which it dies. The plants are laid out 4 ft. by 4 ft. or 5 ft. by 5 ft., according to soil and climate. One acre of planted aloes can give about 60,000 leaves, yielding a ton of dry, marketable fibre.

The following figures relative to the machinery used are given by the Director, having been supplied to him by Les Forges et Fonderies de Maurice:—

Scraping Machines.	Price.	Total Weight.	Weight of Heavier Pieces.	Floor Space Required.	H.P. re-quired.
	Rs.	Kil.	Kil.	ft. in. ft in.	
One pair of scraping machines, 650 m.m., complete on woodwork, with hoods, servants, shafts, 3 plummer blocks and foundation bolts	700	725	135	9 6 x 5 0	7
One pair ditto, 712 m.m., complete as above	740	775	150	9 6 x 5 0	7
One pair ditto, 110 c.m., complete as above	1,000	1,350	430	9 6 x 6 6	Not yet ascer- tained.
One beating machine, with two drums, complete as above ..	475	250	85	9 6 x 5 6	2
One twin-screw bale press, steel press, steel screws, brass nuts and teak body	950	1,500	150	8 6 x 3 3	...
One counter shaft, 20m. long by 625 m.m. diameter	272	495	120	...	...
Four pairs coupling boxes	100	100	...	...	...
Twelve plummer blocks	330	120	...	...	...
Four pullies, 1m. diameter by 160 m.m. wide	220	320	80	...	...
One pulley, 1m. in diameter by 300 m.m. wide	60	90	90	..	..

NOTES.—The 650 m.m. machine is 25½ inches diameter; the 712 m.m. machine is 28 inches diameter; and the 110 c.m. machine is 43 inches diameter.

One *batiense* suffices for three pairs of scrapers.

With the local *gratte* or scraping machine, a man turns out 160 k. of dry fibre in ten hours; for the African Coast, however, where the aloe plant attains to much greater size than in Mauritius, special machinery has to be provided for, and orders can be sent accordingly.

“Enormous quantities of Colonial and foreign fruit are now being poured into this country for Christmas consumption,” says the *Mark Lane Express* (London). “Fruit to the value of nearly £10,000,000 sterling is consumed in this country every year.”

The Woolly Aphis of the Apple.

ALSO COMMONLY KNOWN AS THE BLOOD LOUSE.

By ALBERT KELLY.

THE following article recently appeared in *The Farmers' Advocate*, the official organ of the Orange River Colony Department of Agriculture, from which it is taken over together with the Dutch version.—(Editor.)

This insect pest seems to be very widely distributed throughout the Colony, and letters, accompanied by apple twigs covered with the characteristic masses of cottony matter secreted by the Aphis, are being frequently received, asking that ways and means be suggested for its treatment or control. So much so has this been the case that it has been deemed advisable to collect and print in the form of a pamphlet, for distribution to all persons interested in the subject, all the available information upon the pest.

In a popular article, such as this aims at being, it is always desirable that technicalities should be avoided, and the subject matter set out in as clear and simple a style as is possible; and this course has accordingly been followed. I know that many people object to the life history of the pest being related, thinking that such information is of no practical value. It is certain, however, that some knowledge of the habits of the insect is really necessary for a proper appreciation of the measures suggested for its control; and, therefore, there is no need to apologise further for the brief account which follows.

LIFE HISTORY.

The Aphides, which form a fairly large family, are placed in the Order Hemiptera, or True Bugs, the members of which are characterised by the possession of suctorial mouth parts, and further agree in that their transformations are "incomplete" or unmarked by the great changes of form and habit which characterises a "complete" metamorphosis. In the life cycle of a butterfly or moth—to take a familiar example of a "complete" transformation—there is first, the egg; second, the larva or caterpillar; third, the pupa, sometimes called the chrysalis; and fourth and finally, the imago, or perfect insect. Further, whilst the caterpillar feeds on leaves by means of biting jaws, the butterfly laps nectar from the flowers with its tongue-like mouth. In the development of a "bug" such great changes as these are not apparent, and from the larval to the adult stage, the insect presents very much the same appearance, and no change occurs in its habits.

The members of the Aphis family (*Aphidae*) comprise some of the worst pests known to agriculture, and I need only mention one or two species for the reader to at once realise their great economic importance in the life and economics of man. The grape phylloxera has, perhaps, proved itself one of the most pernicious insect pests ever recorded, and whenever it has been introduced into a wine producing country, disaster has followed. The insect forming the subject of this pamphlet is another notorious representative of the family, and the damage which it occasions in this Colony is but too well known. The wheat louse, the cabbage aphis, the "green fly" of the rose, and the small black plant-lice sometimes found so grossly infesting the peach and citrus trees, are all members of the Aphis family, which may, I think, be regarded as a good second to the Coccidae (scale insects) in its baneful importance to the world of agriculture.

It is the wonderful method of reproduction common to them which accounts for their enormous increase; and which makes these tiny insects, individually so insignificant, combined so destructive, of such importance, and so difficult to combat. The great numbers in which *Aphidae* occur, and the rapidity of their increase is explained by the remarkable non-sexual form of reproduction which obtains with them for the greater part of the year. It may be laid down as a general rule, that, as the outcome of one generation of males and females, there is a long succession of generations of which each insect is a mother capable of bearing a number of offspring without the influence of a male. This always obtains under rigorous climatic conditions, but it is questionable whether the rule applies inexorably under the more temperate conditions which apply in South Africa.

If the rule does not so obtain—and there is no doubt it does not in the case of the peach aphis down in Natal—then the insects increase from year to year by the non-sexual method, the numbers being great or less in accordance with the severity or mildness of the climatic conditions.

Where the rule does obtain, male and female insects are born, during the autumn, by the sexless mothers; pairing takes place, and the female lays what is called the winter egg. This, as its name implies, lies dormant throughout the winter months and, hatching in the spring, gives birth to the parent, or stem mother, of the summer or non-sexual generations. That is what obtains in the colder climate of America and may hold good in this country. To my knowledge, however, the winter egg has not actually been observed here. It will now be appreciated how difficult it is to completely eradicate the pest, once it has gained a footing, as if but one insect is left alive, it provides potent means of further infestation. Claude Fuller, in a note in the *Natal Agricultural Journal*, stated that he found a single peach aphis was capable in the absence of parasites and other natural agencies to check the increase of multiplying, by this non-sexual method, to the number of 3,000,000,000 (three thousand millions) living

descendants in sixty days; or, at the rate of 100 insects per square inch, sufficient to cover nearly 5 acres of land.

Winged aphides are generally present at the approach of winter (April), and these individuals provide for the dissemination of the species. Therefore, in the case of clean trees, a sharp look out for small colonies of aphides should always be kept during the early winter months, and if noticed then, a maximum of good can be obtained with a minimum of labour and expense, in controlling the pest.

The injury done by the woolly aphis does not consist only in the withdrawal of the juices of the plant, but the irritation set up in this action results in the gall-like swellings on stems and roots. Trees, whose roots are infested with the insect, attempt to recover their vitality by throwing out fresh roots, but these are in turn attacked and devitalized, and it is this continual drain upon the tree's resources that causes so much loss of vigour.

REMEDIAL MEASURES.

Advice.

In nothing so much, perhaps, as in dealing with insect pests and plant diseases, is the old adage: "prevention is better than cure" more applicable. In obtaining trees from the nursery, a thorough search should be made for the presence of woolly aphis or its traces, and, if found, refuse to accept delivery of the consignment. In other words, pay for clean trees and see that you get them. If, however, the trees are free from the pest—or any other insect for that matter,—I trust that it is not necessary to warn you against planting them out in the immediate vicinity of trees already infested. If space is limited, make a thorough effort to clean the old trees of the pest; if these are badly attacked and worthless, do not jeopardise the young stock by planting out in proximity to the already infested trees, but root out and burn the latter. However, as it is not always advisable to take such drastic measures—neither can one always afford to do so, although it would often prove the better policy—particulars for the treatment of infested trees, where their destruction is not considered desirable, are given.

Before enumerating any of the treatments to be adopted, I would first emphasise the necessity of obtaining all apple trees upon blight proof stocks. The advantage of this should not require any explanation. I find, however, that although familiar with the term "blight proof stocks," many people are unacquainted with its real application and the object of using them.

For a long time it was recognised that certain varieties of apples were more or less resistant to the attacks of woolly aphis, and this truth suggested the use of these for stock purposes. Experiments were carried out, and the outcome of these was that an apple tree can now be produced which, although subject to attack on the limbs and branches, is immune below the ground. As it is when dealing with the root-infesting form that

most difficulty is met with, the value of the discovery will be appreciated. Because I do not wish to be misunderstood, emphasis must be laid upon the fact that grafting on to immune stocks only insures *the roots* against attack. A farmer once made the complaint to me that, notwithstanding the fact that some of his trees were supposed to be blight proof, the principle must be wrong, as, despite their being so much advertised, he found that these "new fangled trees" were just as subject to the blight as were his old ones. Needless to explain, upon inspection it was found that only the limbs had been attacked, and no attempt at treatment had been made.

Treatment for Aerial Form.

The treatment of the aphis upon the trunk and branches is practicable and profitable, but nevertheless it must be thoroughly undertaken and an endeavour made to kill every insect.

Spraying with paraffin emulsion is attended with the best results, but, owing to the insect succumbing readily to many other contact insecticides, recourse may be had to them. Still the former works out the most economical in the end; if there is anything to choose—because it can also be used for the treatment of the root infesting form, to the best advantage, its use is recommended here.

Preparation of Paraffin Emulsion.

The stock emulsion is prepared according to the formula below, *but must be diluted for use*:—

Paraffin	2½ gallons.
Soap	1 pound.
Water	1 gallon.

Place the pot containing the water on the fire, and in it dissolve the soap, which should previously be cut up into shavings. Then, whilst boiling, *remove from the fire* and add to the paraffin. The mixture should now be agitated thoroughly, and this is best done by pumping the mixture back upon itself for about ten minutes, by the aid of a syringe or, preferably, a spray pump. As the paraffin and the soap solution combine a smooth, creamy emulsion forms, and, if a proper mixture has been obtained, it will keep, without separating, for several weeks. The emulsion is best applied whilst still warm. Great care should always be taken to secure a thorough union of the ingredients, and should any free oil show itself, the preparation should be discarded and a fresh supply made. Soft water should be used. Hard water may be softened by stirring in it, and allowing to soak, a few spadefuls of wood ashes.

The application of pure paraffin will result in injury to almost any tree. It is really very easy to obtain a good emulsion, however, and if ordinary care is taken in its preparation, failure need not be anticipated. For use against the woolly aphis, dilute one part of the stock emulsion to nine parts of water.

If the trees are but slightly attacked, the application of the emulsion may be made with a spray pump, but where the trees are badly infested, the emulsion may be made with a spray pump, but where the trees are badly infested, the emulsion should be applied with a scrubbing brush, and that part of the tree beyond reach should then be thoroughly sprayed.

Particular attention should be paid to old and neglected trees, as the rough surfaces of these provide many crevices in which the aphides can secure shelter from the deadly spray. In using a brush, many cavities, which afford the insects shelter, can be treated; these nooks cannot always be reached when a spray pump only is employed. In spraying for woolly aphis, always get the nozzle as close as possible and apply with force, so as to knock off the woolly material, which provides a certain amount of protection to the enveloped insect.

Treatment of Root Infesting Form.

For a long time the greatest difficulty was experienced in the treatment of this aphis when occurring upon the roots of trees. No sooner had the tree been cleaned of the insect above ground than those on the roots migrated to the limbs and re-infested them. This was very disheartening, more especially as any application to the roots of the tree was ineffectual in killing all the aphis, or, if it succeeded in this, it was generally also successful in killing the trees, in whose interest and benefit it had been made.

Many suggestions have been made for the treatment of this underground form of the aphis, but these, when put to the test, have in most instances, been found unsatisfactory. As a result of experiments made during the years 1905-6, the use of paraffin emulsion may now be safely advocated.

Extensive trials of this and other insecticides were made at the Georgia Experiment Station, and the results obtained are given in Bulletin XXIII. of that State. Experiments with tobacco dust, kainit, and carbon bisulphide yielded unsatisfactory results. It was found that the last mentioned killed the aphis over a limited area around the point of application, but that it could not be used in sufficient quantities to kill all the aphis without, at the same time, killing or injuring the tree.

In fact, the only preparation that was proved, by thorough tests, to be a direct and effective remedy, and one which could be economically employed, was the application of paraffin emulsion.

Paraffin Emulsion for Aphis on Roots.

The emulsion used in all the experiments against woolly aphis was one made according to the following formula:—

Paraffin	2 gallons.
Whale oil soap	$\frac{1}{2}$ lb.
Water	1 gallon.

(1 lb. of common soap may be used where whale oil soap is unobtainable.)

This undiluted preparation is spoken of as "Stock Emulsion"; a 10 per cent. emulsion is obtained by adding 17 gallons of water; a 15 per cent. by adding 10 1-3rd gallons, and a 20 per cent. by adding 7 gallons, to every three gallons of the stock emulsion. In diluting, only soft or rain water should be used, and this also applies in making up the emulsion.

Before applying the emulsion, the soil should be removed from around the base of the infested trees, in a circle varying with the size of the tree and the spread of the infested roots. The excavation should be two to three inches deep, or enough to partially expose the roots. In all cases the circle should extend at least 18 inches from all sides of the tree, and in the case of large trees whose roots extend far out, it may have a diameter of five or six feet.

The emulsion is now applied in sufficient quantity to saturate the newly exposed soil to a depth of two or three inches, and the earth immediately replaced to its normal level.

For a circle three feet in diameter, three gallons of the diluted solution will suffice, and, of course, for larger trees a correspondingly greater amount of emulsion must be used.

"Without going into details concerning the different tests of paraffin emulsion, it may be stated that all the aphids were killed by every application, from the weakest to the strongest" (10 to 40 per cent.) "wherever the emulsion came in contact with the infested roots."—(Smith.) Later examination showed that the emulsion, applied in the quantities mentioned above, soaked down, in many cases, to a depth of ten and twelve inches. Hence it may not be really necessary to apply the emulsion in such large quantities as recommended, but it is better, perhaps, to do so and thus ensure success.

The 10 per cent. solution was found to be just as effective in killing the aphids as the stronger mixtures, but the odour of the latter remained in the soil for a longer time and so acted as a more lasting deterrent. After careful observation and consideration of the subject, it was thought best to recommend the use of the 15 per cent. emulsion for treating badly infested trees. The odour of this will remain in the soil for a considerable time, and at this strength it is more economical to employ the treatment than when using the stronger percentages.

Caution.

The trees should be treated when the soil is fairly dry, if the best results are to be obtained.

In these experiments it is important to note that it was found to

be inadvisable to treat the trees when in a dormant condition; as, owing to the absence of running sap, injury to the tree resulted. It may be pointed out, however, that this injury was only sustained when the 40 per cent. emulsion was employed, and the author was of opinion that the application of the 15 per cent. solution would not, at any time, be attended with injurious consequences. In the absence of definite information on this point, it seems better to recommend that the treatment be carried out in the summer months only, a start being made in September.

It may not be out of place here to repeat my injunction to the effect that care must be taken in the preparation of the mixture, and any solution in which a perfect emulsion has not been obtained, and which separates out when cold, should be discarded.

Conclusion.

Having regard to the success attending the use of paraffin emulsion in America, as reflected in the above-mentioned bulletin, it seems perfectly sound to recommend its adoption here. I would be glad, therefore, if anyone carrying the recommendation into effect would kindly advise me of the results obtained.

It must be understood that the emulsion, being a contact insecticide, only kills those insects with which it comes in contact. Therefore, it will be recognised that aphides living on roots outside the circle of treatment will escape, but as it is on the main roots in proximity to the trunk, that most of the damage is occasioned, and from whence the insects migrate to the trunk, those left will not affect the success of the application. Further, the paraffin acts as a very strong deterrent, the odour remaining in the soil for several months after treatment, and so these live aphides will not venture inside the once treated circle until a considerable time has elapsed.

In the course of an interview with a representative of *South Africa* recently, Sir John Macdonald, C.B., who has lately returned to England after his trip in South Africa as a member of the Freights Commission, said: "Of course, there are great possibilities in the way of developing the mineral wealth, but what struck me most of all was the great agricultural future of the country. I think there are many signs that a start has been made in the improvement of the agriculture of the country. I had many opportunities of talking to people engaged in farming, and took full advantage of them. The farmers are becoming more alive to new methods, and it occurred to me that there is more intelligence and energy brought to bear on agriculture than was the case previously."

De Wollige Plantluis van de Appel Boom.

SCHIZONEURA LANIGERA (HAUSS).

OOK DIKWILS GENAAMD DE BLOEDLUIST.

Door ALBERT KELLY, F.E.S.

DEZE insekten plaag schijnt door de hele Kolonie wijd verspreid te zijn, en brieven, vergezeld van appelboom-takken die bedekt zijn met de eigenaardige klompjes katoenachtige stof, afgescheiden door de plantluis, worden herhaaldelijk ontvangen met 't verzoek om middelen aan de hand te geven voor behandeling of controle. Zo zeer is dit het geval geweest dat het wenselijk werd geacht om alle beschikbare inlichtingen inzake de plaag te verzamelen en in pamfletvorm te laten drukken ter verspreiding onder alle personen die in 't onderwerp belang hebben.

In een populair geschriftje, zoals dit tracht te zijn, is 't altijd wenselijk, dat technische termen worden vermeden, en 't onderwerp zo eenvoudig en duidelijk mogelijk uiteen wordt gezet; deze koers is derhalve gevolgd.

Ik weet, dat vele mensen objeksie hebben tegen 't meedelen van de levensgeschiedenis, daar ze denken dat dit van geen praktische waarde is. 't Is echter zeker, dat enige kennis van de gewoonten van 't insekt werdelijk nodig is voor 't voldoende begrijpen van de middelen die aan de hand gegeven worden ter controle en is er dus geen noodzakelijkheid om verdere vershoning te vragen voor het hiervolgend kort verslag.

LEVENS GESCHIEDENIS.

De plantluizen, die een tamelijk grote familie vormen, worden geplaatst in de Orde Hemiptera of ware weegluizen; de leden van deze Orde worden gekenmerkt door 't bezit van zuig-monden, en komen verder met elkaar overeen doordat hun gedaanteverwisseling "onvolledig" is; dat is dat ze niet zulke grote veranderingen van vorm en gewoonte ondergaan als men een "volledige" gedaanteverwisseling noemt. In de levensgeschiedenis van de schoenlapper of de mot—om een bekend voorbeeld te nemen van een "volledige" gedaanteverwisseling—is er eerst 't ei, dan komt de larve of rups, derdens de pop, en ten slotte het volgroeide insekt. Verder, terwijl de rups zich voedt met blaren en een bijtmond heeft, zuigt de schoenlapper met zijn tongachtige mond vocht uit de bloemen. In de ontwikkeling van een weegluis worden niet zulke grote veranderingen waargenomen, en van 't stadium der larve totdat 't insekt volgroeid is, komt 't heel veel in uiterlik overeen, en geen verandering heeft in zijn gewoonten plaats.

De leden van de boamluis-familie ("Aphidac,") veroorzaken enige van de ergst bekende plagen voor de landbouw, en ik hoef maar net een paar soorten te noemen om de lezer met eens te laten zien welk een belangrijke rol ze spelen. De druif-phylloxera is misschien een van de schadelijkste insekten-plagen gebleken; als die binnenkomt in een land waar wijnbouw gedreven wordt, zijn de gevolgen noodlottig. Het insekt dat 't onderwerp van dit pamflet vormt is ook een berucht vertegenwoordiger van de familie, en de schade die het in deze Kolonie veroorzaakt is maar al te goed bekend. De koorn-luis, de koolluis, en "groene vlieg" van de roos, en de kleine, zwarte plantluis die soms in zo groten getale de perzik en limoen bomen aansteekt, zijn alle leden van de boamluis-familie, die, naar mijn mening, beschouwd kan worden als van even groot nadeel voor de landbouw-wereld als de "Coccidae" (schaal-insekten).

Ze hebben een wonderlike manier van voortplanting, waardoor verklaard wordt dat ze zo verbazend snel toenemen; en 't welk deze nietige insekten (als enkelingen zo inkonsekwent, verenigd zo vernietigend) van zulk een belang maken en zo moeilijk te bestrijden. De grote klompen waarin de boomluizen verschijnen, en de snelheid waarmee ze toenemen wordt verklaard door de merkwaardige niet-seksuele vorm van voortplanting die gedurende 't grootste deel van 't jaar plaats heeft. Als algemene regel kan men vaststellen, dat als 't resultaat van een geslacht van insekten van de mannelijke en vrouwelijke seksen, er een lange opeenvolging van geslachten komt waarvan elk insekt een moeder is die een aantal nakomelingen kan voortbrengen zonder dat een mannelik insekt nodig is. Dit is regel wanneer de weersgesteldheid straf is, maar 't is twijfelachtig of de regel even vast opgaat onder de gematigder omstandigheden van 't klimaat zoals gelden voor Zuid-Afrika.

Indien de regel niet heerst—en er bestaat geen twijfel aan dat hij niet geldt voor de perzik-luis onder in Natal—vermeerderen de insekten van jaar tot jaar volgens de niet geslachtelijke methode: de aantallen zijn groter of kleiner al naar 't klimaat streng of mild is.

Waar de regel wel heerst, worden vrouwelijke en mannelijke insekten geboren in 't najaar, van de nietgeslachtelijke moeders; het paren vindt plaats, en het wijfje legt, wat genoemd wordt het "winter ei." Dit ei ligt, zoals de naam aangeeft, de wintermaanden over en broeit in de lente uit, waaruit de stam-moeder van de zomer- en niet-geslachtelijke insekten onstaat. Dat is wat plaats vindt in 't koudere klimaat van Amerika en het kan ook voor dit land gelden. Voorzover ik weet, echter, is het winter ei hier niet werkelijk waargenomen. Men zal nu verstaan, hoe moeilijk 't gaat de plaag helemaal uit te roeien waar die zich eens een plaats heeft veroverd. Als er maar net een insekt in 't leven is gebleven is dat voldoende om verdere besmetting te veroorzaken. Claude Fuller heeft in het *Natalse Landbouw Joernaal* meegedeeld, dat naar zijn bevinding een enkele perzikluis reeds in staat is, in afwezigheid van parasieten en andere natuurlijke middelen om het te beletten, zich te

vermenigvuldigen tengevolge van deze niet-seksuele manier tot het aantal van 3,000,000,000 (drie duizend miljoen) levende nakomelingen in zestig dagen; of, als men 100 insekten per vierkante duim rekent, genoeg om bijne vijf acres grond (ruim twee morgen) te dekken.

Gevleugelde plantluizen zijn in de regel aanwezig tegen 't naderen van de winter (April), en deze diertjes zorgen voor de verspreiding van de soort. Als dus de bomen schoon zijn, is 't altijd nodig scherp dop te houden voor kleine kolonies van plantluizen in de eerste wintermaanden, en als ze worden opgemerkt, kan men met weinig moeite en onkosten bijzonder veel doen ter kontrole van de plaag.

De schade, aangebracht door de wollige plantluis bestaat niet alleen in 't onttrekken van vocht aan de planten, maar de prikkeling daardoor veroorzaakt heeft tot gevolg dat opzwellingen, gelijkende op galnoten, plaats hebben, op de boomstammen en wortels. Bomen waarvan de wortels door deze insekten zijn aangetast trachten hun levenskracht te behouden door nieuwe wortels te schieten, maar ook dezé worden aangevallen en uitgemergeld, en 't is deze voortdurende uitputting, dat 't verlies van zoveel levenskracht veroorzaakt.

GENEESMIDDELEN.

Raadgeving.

Voor niets geldt misschien 't oude spreekwoord: "voorkomen is beter dan genezen," meer dan voor de behandeling van insekten-plagen en planten ziekten. Wanneer men bomen krijgt van de boomkwekerij moet men ze nauwkeurig onderzoeken of er ook sporen van de wollige plantluis aan te vinden zijn, en worden ze aangetroffen, weiger ze dan in ontvangst te nemen. Met andere woorden: betaal voor schone bomen en zorg er voor, dat u ze krijgt. Als de bomen echter schoon zijn van deze of andere insekten is 't natuurlijk zaak ze niet te planten in de nabijheid van aangestoken bomen. Als ruimte beperkt is, doe dan een zorgvuldige poging om de oude bomen schoon te maken; zijn deze ernstig aangetast en van geen waarde, waag de jonge bomen niet door ze in de omgeving van de reeds aangetaste te plaatsen, maar roei uit en verbrand de laatstbedoelde. Daar 't echter niet wenselijk is altijd zulke krachtige maatregelen te nemen—bovendien kan men 't niet altijd bekostigen, ofschoon 't dikwijls de beste methode zou blijken—worden hier biezonderheden gegeven voor de behandeling van de aangestoken bomen.

Voor eenige der aan te wenden maatregelen op te noemen wil ik eerst met nadruk op de noodzakelijkheid wijzen dat men alle appelboomen moet krijgen, die op ziekte-vrije stammen ge-ent zijn. 't Voordeel hiervan behoort geen uitleg nodig te hebben. 't Is me echter bekend, dat vele personen, ofschoon goed bekend met de term "ziekte vrije stammen" toch niet weten hoe ze eigenlijk te gebruiken en wat 't doel van 't gebruik ervan is.

Reeds lang werd gemerkt, dat zekere soorten appelbomen min of

meer bestand waren tegen de aanval van de wollige plantluis, en dit feit deed denken aan 't gebruik er van als stammen. Proeven werden genomen en 't gevolg is, dat tans een appelboom kan worden voortgebracht die, ofschoon het insekt kwaad kan doen aan de takken, er geen last van heeft dat de wortels worden aangetast. De ontdekking is van grote waarde, omdat 't moeilijkst gaat de ziekte te bestrijden als de wortels worden aangetast. Omdat ik niet misverstaan wil worden, moet nadruk worden gelegd op 't feit, dat het enten op stammen die tegen de ziekte bestand zijn, net maar *de wortels* bevrijdt voor een aanval. Een landbouwer klaagde er eens tegen mij over, dat, niettegenstaande sommige van zijn bomen doorgingen voor ziekte-vrij, het beginsel verkeerd moest zijn, want dat deze bomen even goed aan ziekte onderhevig waren als zijn oude. 't Is onnodig te zeggen, dat bij onderzoek bleek dat alleen de takken werden anagetast, en dat geen poging tot behandeling aangewend was.

Behandeling boven de grond.

De behandeling van de plantluis aan de boomstam en takken is doelnik en profijtelik, maar moet niettemin met zorg ondernomen worden, en een poging moet worden gedaan om elk insekt te doden.

't Bespuiten met een parafien-mengsel levert de beste resultaten op, maar men kan ook zijn toevlucht nemen tot andere mengsels, omdat 't insekt doodgaat aan verscheiden smeermiddelen. Toch is het eerst genoemde per slot van rekening 't voordeligst, als er een keuze moet worden gedaan, omdat het ook kan gebruikt worden voor 't behandelen van aangestoken wortels, en met 't beste gevolg; redenen waarom 't gebruik er van wordt aanbevolen.

Bereiding van parafien mengsel.

Het mengsel voor 't behandelen van de stam wordt als volgt bereid (*het moet echter voor 't gebruik verdund worden*):

Parafien, 2 gallon.

Zeep, 1 lb.

Water, 1 gallon.

Zet de pot, die 't water inhoudt, op 't vuur en los de zeep er in op. Eerst moet men de zeep in kleine schijffjes snijden. Als 't water kookt, *neem 't van 't vuur* en voeg bij de parafien. Het mengsel moet flink door elkaar gemaakt worden, en dit doet men 't best door het heen en weer te pompen met een sproeipomp. Als de parafien en de zeep-oplossing zich verbinden ontstaat er een glad, roomachtig mengsel, en als een goed mengsel wordt verkregen zal dit verscheiden weken houden zonder zich af te scheiden. Men doet 't best het mengsel aan te wenden, terwijl 't nog warm is. Men moet er vooral voor zorgen, dat de verschillende delen van 't mengsel zich goed verenigen, en als er nog van de parafien afzonderlik is, moet men 't klaar gemaakte vocht liever weggooien en nieuw maken. Zacht water moet gebruikt worden. Men kan hard water

zacht maken door er een paar schoppen hout-as in te weken en dan flink om te roeren.

Wanneer men pure parafien aanwendt, zal bijna elke boom er door beschadigd worden. 't Is werkelijk heel gemakkelijk een goed mengsel te verkrijgen, en als gewone zorgvuldigheid betracht wordt bij 't bereiden hoeft men geen misluking verwachten. Als men 't mengsel tegen de wollige plantluis aanwendt moet men verdunnen: een deel van 't "stammengsel" moet op negen delen water gedaan worden.

Als de bomen maar licht zijn aangetast kan men 't mengsel aanwenden door middel van een sproeipomp, maar als de bomen erg aangestoken zijn, moet men 't mengsel met een boender inwrijven, en 't gedeelte van de boom dat men niet goed bereiken kan moet zorgvuldig besproeid worden.

Bijzondere aandacht moet worden gewijd aan oude, verwaarloosde bomen, daar de ruwe oppervlakte daarvan vele scheuren heeft waarin de insekten zich kunnen verbergen voor de dodelijke besproeiing. Bij 't gebruik van een ruwe borst bezullen vele holten, waarin de insekten zich wegsteken, bereikt worden, en dit kan niet altijd wanneer men een sproeipomp gebruikt. Bij 't besproeien van de wollige plantluis, moet men de bek van de sproeipomp zo dicht mogelijk bij de boom brengen en met kracht pompen, om de wollige stof eraf te maken, waarin het insekt zit opgesloten.

Behandeling van aangestoken wortels.

Lange tijd werd de grootste moeilijkheid ondervonden in 't behandelen van boomluizen, die op wortels voorkomen. Nog maar nauweliks was de boom boven de grond schoon, of de insekten die de wortels hadden aangestoken, trokken naar 't bovengrondse gedeelte en besmetten dit. Dit was erg ontmoedigend, vooral omdat wat er ook gedaan werd aan de wortels, de plantluis daar niet helemaal kon worden uitgeroeid, of als dit wel gelukte was dit in de regel ook voldoende om de boom te doden, die men juist had willen redden!

Vele dingen zijn al aan de hand gedaan voor 't doden van de ondergrondse plantluis, maar de meeste bleken bij 't nemen van proeven onbevredigend. Naar aanleiding van proefnemingen, gedaan in de jaren 1905—06, kan men nu 't gebruik van parafien-mengsel veilig aanbevelen.

Uitgebreide proefnemingen met dit en andere insekten dodende middelen zijn genomen op de proefstations van Georgie, en de verkregen resultaten zijn in Bulletin 23 van die Staat meegedeeld. Proefnemingen met tabakstof, kainiet en "carbon bisulphide" leverden onbevredigende resultaten op. Bevonden werd dat laatstgenoemd middel bleek de boomluis te doden over een beperkte ruimte om de plek waar 't werd aangewend, maar 't kon niet in voldoende hoeveelheid gebruikt worden om al de plantluizen dood te maken, zonder tegelijkertijd de boom te doden of te benadelen. 't Enige middel dat inderdaad, na zorgvuldige proeven

bleek, direkt en ajdoend bleek, en dat zonder veel onkosten kon worden aangewend, was 't parafien mengsel.

Parafien mengsel voor de plantluis aan wortels.

Het mengsel bij al de proefnemingen tegen de wollige plantluis aangewend, werd bereid volgens de onderstaande formule:—

Parafien 2 gallon.

Walvis-traan-zeep, $\frac{1}{2}$ lb.

Water, 1 gallon.

(Men kan ook, 1 lb. gewone zeep gebruiken als walvis-traan zeep niet te krijgen is.)

Dit onverdund mengsel wordt genoemd: "stammengsel"; een mengsel van 10 percent wordt verkregen door 17 gallon water bij te doen; een van 5 percent door 10 1-3 gallon bij te voegen, en een van 20 percent door bijvoeging van 7 gallon bij elke drie gallon van het "Stam-mengsel." Bij 't verdunnen moet met net zacht of regenwater gebruiken, en dit geldt ook voor 't maken van 't oorspronkelijke mengsel.

Alvorens het mengsel aan te wenden moet men de grond om de stam van de aangetaste boom in een kring wegmaken, al naar de grootte van de boom en de uitgestrektheid der wortels. Men moet twee of drie duim diep uitgraven, of in elk geval zoveel dat een deel van de wortels bloot komen. De sirkel moet minstens 18 duim van de boom (dus 36 duim) in doorsnee zijn, en bij grote bomen die wijd uitgestrekte wortels hebben kan de doorsnee vijf of zes voet zijn.

Het mengsel wordt in voldoende hoeveelheid aangewend om de bloot gemaakte grond twee of drie duim diep nat te maken, en de grond moet onmiddelik daarna tot zijn oorspronkelijke hoogte aangevuld worden.

Voor een sirkel van drie voet doorsnee zullen drie gallon van 't rocht voldoende blijken, en natuurlik moet voor grotere bomen meer van 't mengsel, overeenkomstig de grootte, worden aangewend.

"Zonder in bijzonderheden af te dalen met betrekking tot de verschillende proefnemingen met parafien, kan worden verklaard, dat door het mengsel al de plantluizen gedood werden bij elke aanwending, van de zwakste tot de krachtigste." (10 percent tot 40 percent) "waar ook het mengsel maar in aanraking kwam met de aangestoken wortels." (Smith) Later onderzoek toonde aan, dat het mengsel, aangewend in de hoeveelheden boven gemeld, in vele gevallen wegzakte tot een diepte van tien of twaalf duim. Daarom is 't misschien niet werkelijk noodzakelik om het mengsel in zulke grote hoeveelheden aan te wenden als werd aanbevolen, maar 't is toch misschien beter 't wel te doen om zeker te zijn van 't sukses.

Het mengsel van 10 percent bleek even goed de plantluizen te doden als dat krachtiger was, maar de reuk van 't sterkere bleef langer in de grond, en werkte dientengevolge langer na. Na zorgvuldige waarnemingen en overwegingen dacht men 't best aan te bevelen 't gebruik van 't

mengsel van 15 percent bij 't behandelen van sterk aangetaste bomen. De reuk hiervan zal lange tijd in de grond blijven, en in 't gebruik is 't mengsel van 15 percent goedkoper dan de sterkere.

Waarschuwing.

De bomen moeten behandeld worden als de grond vrij droog is; dan zal men de beste resultaten verkrijgen.

Bij deze proefnemingen is 't van belang te weten, dat 't onwenselijk werd gevonden de boom te behandelen als zijn funksies stil staan, daar dan tengevolge van afwezigheid van vloeiende sappen, schade aan de boom wordt gedaan. 't Moet echter gezegd worden, dat deze schade alleen werd toegebracht als 't mengsel van 40 percent werd aangewend, en de auteur was van opinie, dat 't aanwenden van 't mengsel van 15 percent nooit enig schadelik gevolg zou hebben. Daar besliste informatie betreffende dat punt ontbreekt, lijkt het meer aanbevelenswaardig de behandeling alleen in de zomer te doen plaats hebben, aanvangende met September maand.

Nog eens wordt er aan herinnerd, dat men bij 't bereiden van 't mengsel zorgvuldig te werk moet gaan, en dat alle mengsel waarvan de bestanddelen niet voldoende doorelkaar geraakt zijn, en dat zich scheidt bij 't koud worden, weggegooid moet worden.

(Wordt vervolgt.)

An effective method of storing potatoes has been adopted by a half-caste farmer at Pukerau, New Zealand. The plan is thus described:—"Corner posts, 17 ft. apart one way and 5 ft. the other, were run into the ground. On these a frame was built 17 ft. by 5 ft., $2\frac{1}{2}$ ft. deep, 4 ft. above the ground. The bottom of the ground was floored with slabs some 2 in. apart. This was then covered with an inch or so of manuka scrub to prevent the potatoes falling through. The sides and ends were enclosed by rails, or battens nailed to the corner posts, so as to enclose more manuka scrub, which was wattled in with a stay or two in the middle, let into the ground for extra stability and support to the structure. The potatoes were then stored therein—those that were selected for seed being placed in kits, and the whole covered with about six inches of loose fern. The explanation given was that the potatoes did not heat, and being fully exposed to wind and air, no matter how heavy it rained, they soon dried."

East Coast Fever.

TRIALS OF ALLEGED CURES

THE existence of East Coast Fever in the land has given rise to many attempts to find remedies or cures that would serve to materially reduce the present high percentage of deaths from the disease; and the Department of Agriculture has on several occasions been requested to permit trials, under its auspices, of various alleged "cures." The policy of the Department has always been to give as much encouragement as possible to those who have come forward with remedies which they desire to be tested, but up to the present no results have been obtained that have left much room for hope.

Two gentlemen of the Dundee Division—Messrs. C. J. Pieters and A. J. Van Tonder—each claimed recently to have discovered some curative treatment for East Coast Fever; and in order to test the efficacy of the alleged cures a number of Dundee farmers subscribed 15 head of cattle, to be placed at the disposal of these gentlemen. The cattle were, at the request of the farmers, placed under the control of an officer of the Veterinary Branch and a member of the committee appointed for the purposes of the experiment, to see the test carried through. The Veterinary Branch offered to scientifically test these "cures" by placing infected ticks on a number of the animals; thereby ensuring the contraction of the disease. The farmers concerned preferred, however, to submit the cattle to natural veld infection. The fact frequently seems to be lost sight of, that, to allow animals to run on infected veld, is often not a speedy method of producing the disease, as animals may run on such pastures for a considerable time before being bitten by an infected tick; and, when testing a "cure" by such means, every day that an animal survives on such veld goes to strengthen the belief in the minds of many that a more or less efficacious cure or preventative has been found, whereas the fact is that it is only a matter of time before the animal becomes infected and dies. As the farmers referred to were, however, sufficiently public spirited to supply the cattle themselves, and the Department considered that every reasonable facility should be given for the test of the "cures," it was decided to have the animals placed on what was known to be infected veld, to be submitted to any treatment to which Messrs. Pieters and Van Tonder desired to subject them.

Fifteen animals were accordingly placed on infected veld on the farm "Vaalkop," Dundee Division, on the 9th October last. Of these, five were treated by Mr. Pieters and five by Mr. Van Tonder, the remaining five being simply allowed to run on infected veld without any

treatment, thus serving as "control" animals. Messrs. Pieters and Van Tonder were given every facility to treat their ten animals as often as they desired.

The results of the experiment were that, within a month of having been placed on infected veld, fourteen of the fifteen animals died, the remaining one—which at the time of writing is still alive—having up to date shown no evidence of having contracted the disease. This animal is one of those treated by Mr. Pieters. From the fourteen animals which died, blood smears were examined by the Government Bacteriologist and were in each case pronounced positive of East Coast Fever.

It may be pointed out that the animals which were treated died within the same time as those which had not been treated. This fact affords evidence of the absence of any curative or remedial effect in either Messrs. Pieters' or Van Tonder's treatment.

The Land Board.

MONTHLY MEETING.

THE Land Board held its monthly meeting on the 3rd and 4th December, in the offices of the Surveyor-General. Mr. Watson, who has been appointed Secretary, Minister of Agriculture for the purposes of the Agricultural Development Act, in place of Mr. E. T. Mullens, took his seat for the first time as the Government member of the Board, and was welcomed by Mr. L. Acutt (the Chairman) and Messrs. St. George Arbuthnot and E. J. Turner. Mr. G. R. Richards was absent from the meeting, as he had been called out on Militia duty.

Ten applicants for land appeared in person before the Board, and were passed as suitable settlers. A number of applicants who had intended to interview the Board were unable to attend owing to the mobilisation of the Active Militia.

The Minister of Agriculture, the Hon. W. A. Deane, met the Board and discussed with them, amongst other matters, the advisability of advertising lists of lands available for allotment every three months, and it was decided that this should be done. On the Board pointing out that the Winkel Spruit farms had been over applied for, the Minister went into the question of other lands in the neighbourhood of Winkel Spruit being thrown open for allotment.

Before withdrawing Mr. Deane asked the Board to be good enough

to furnish him with their recommendation as to the action to be taken with regard to the payment of the arrear instalments and water rates.

Five applications for advances under the provisions of the Agricultural Development Act, 1904, were laid before the Board. The Board was, however, only able to recommend the granting of one.

In order to ensure the submission of only *bona fide* applications for consideration, the Board adopted a resolution to the effect that no application was to be submitted to the Land Board unless the applicant had deposited a sum of £15 to cover the probable charges of the survey of the land. In the event of the applicant not being successful in obtaining the land, the amount deposited would be refunded.

Mr. Duff, of Messrs. Duff and Eadie, appeared before the Board with regard to assistance being granted under the Agricultural Development Act towards the establishment of a Co-operative Ham and Bacon Factory, to be erected at Umlaas Road, subject to satisfactory security being forthcoming. The Board recommended that the application be favourably considered by Government. A similar request forwarded from Greytown could not be considered, as the Board was of the opinion that one ham and bacon factory would meet the present needs of the Colony.

Messrs. Fergg and Emmett, the Members for the Northern Territory, met the Board, and discussed with them the application for assistance under the Agricultural Development Act for the Northern Districts Co-operative Agricultural Association. Mr. Levisohn, the Secretary of the Board, was also present, and was asked to furnish further particulars of the matter, when the application would be again gone into by the Board.

The next meeting of the Land Board was fixed for Tuesday, the 7th January, 1908.

An English magistrate recently imposed a novel sentence on a school-boy who had damaged a tree belonging to the Ealing Corporation. He ordered the boy to provide another tree, and plant it himself. This seems a practical way to make the punishment fit the crime.

The following gentlemen have been declared duly elected members of the Indian Immigration Trust Board for three years from the 1st January, 1908:—For Division No. 1: Sir Liège Hulett, K.B., and Edward Saunders; for Division No. 2: Charles P. Reynolds and E. W. Hawksworth; for Division No. 3: George D. Alexander; for Division No. 5: Charles G. Smith.

Umvoti Agricultural Society.

PRESIDENT'S ANNUAL REPORT.

WE have been favoured with the following copy of the Annual Report of the President (Mr. Theo. Menne) of the Umvoti Agricultural Society:—

Gentlemen,—Our position, in common with many other societies, has been unfortunate during the last year or two through causes arising out of the native unrest and the East Coast Fever. To prevent the spread of the latter, restrictions had to be brought to bear which deprived most of the farmers of transport facilities for many months; this prevented many from exhibiting their produce and further tended in many ways to retard the success of our Annual Show, which seriously affected our finances in consequence.

THE ANNUAL SHOW.

The entries at the last show, greatly attributable to the section for cattle being deleted from the schedule of the Society, showed a great decrease in numbers, yet as regards quality the exhibits were quite up to expectations. Horses were quite up to the usual standard of district shows. Carriage horses were excellent, and the riding, driving, and jumping competitions were all that could be desired, both as regards numbers of competitors and performances. Sheep, though few in numbers, were particularly good, as was subsequently confirmed by the success of the premier lots at the Royal Agricultural Show in Maritzburg as well as the Show in Durban. I may here remark that we were fortunate enough to have an upcountry gentleman with great experience in judging sheep in the Transvaal and O.R. Colony, to judge in this section, and that his reports regarding the exhibits were most favourable. In the poultry section there was a fair display and splendid examples of breeds were shown. I would, however, suggest that more attention should be given to utility breeds. Table birds and egg producers are what practical farmers should aim at. The products of the soil were well represented, although outlying districts were practically shut off from exhibiting in consequence of the suspension of ox traffic. The quality of the exhibits in this section was, without doubt, good. Industries attracted a deal of attention. Various productions from local manufacturers were special features, notably the vehicles, iron gates, etc., exhibited by H. W. Reeve & Co., saddlery and harness by Lyle Bros. and F. Sutton, fruit boxes made from wattle wood by the Harden Heights Wattle Co., Ltd., and ostrich feathers dyed and curled by Mrs. J. Sim Edwards.

THE JUDGING COMPETITION

proved an innovation worthy of consideration by other societies. The effect of this competition will no doubt in time relieve the anxiety of many district societies in obtaining competent judges for their shows. I would, however, suggest, to create a more healthy influence amongst the competitors, that they be required to fully give their reasons and to explain the points favourable or unfavourable to the animals or produce adjudged or passed over, on the judging cards, for the criticism of the judge who decides the award.

It is to be hoped that in the coming year the Society will meet with better support both financially and otherwise from the farming community generally than it has done during recent years. I must impress upon members to use their influence to get the young men to join and to point out the advantages of belonging to such an institution. I hold that an agricultural society is an institution for the common weal of all agriculturists and should appeal as no other kindred institution does to the sympathy and active support of all well-wishers of the farming industry. If a man has any ambition and is desirous of becoming a successful farmer he should endeavour to improve his stock and products so as eventually to be able to produce nothing but the best; and the best means of testing the merits of his products is by placing them in open competition against those of his neighbour. Far greater advantages are to be gained by the pushing and energetic farmer by exhibiting his produce and thus making its merits known, than the remuneration offered by the mere money value of the prizes.

There are not wanting signs of a

GREAT AGRICULTURAL REVIVAL

throughout South Africa, and this indeed is a healthy sign. In our Colony of late years stock farmers, in spite of the threats of the much dreaded East Coast Fever, are steadily improving their breeds of cattle. This is a good omen, and I sincerely hope that it will be the means of ousting for ever the imported milk and butter from the Colony.

It is pleasing to note that the Colony is now thoroughly organising for the opening up of the

EXPORT TRADE.

The interest taken in the expansion of our producing industries, and the good work Sir Pieter Bam is trying to arouse in the different Colonies, is a movement in the right direction, and it is to be hoped will meet with the success it deserves. The exportation of mealies is now assuming proportions greater than even the most sanguine ever expected. This is the first attempt at co-operation, and there is no reason why co-operation in other ventures should not be equally successful. It is only by combined efforts, the adoption of modern and improved methods and by acquiring information, scientific as well as practical, that we will be able to improve

and increase production to the fullest extent of possibilities, and, by such means, secure a permanent market for our produce and further advance our individual welfare as well as the prosperity of the Colony. In this county we have the right class of men, most of them progressive and energetic and nearly all of them keen to develop their farms and ensure a comfortable home. To this fact great importance must be attached, for this is the class of men necessary to stimulate production and raise our County of Umvoti to that position so rightly its own, that is, as a producing district, second to none in the Colony.

It is satisfactory to note that the

EAST COAST FEVER

is being kept well in hand through the efforts of the Government and the Veterinary Department. I feel confident that the Department, continuing on the principal now adopted, will be successful in stamping out the disease completely.

It is with extreme sorrow I have to record the death of one of our fellow members, in the decease of Mr. W. K. Ente, who was auditor of this Society for the past fourteen years. We have sustained an irreparable loss in Mr. Ente, he being one of the most respected colonists. His services were invaluable and his memory ought to be an example to us for thorough strictness and uprightness in whatever business he undertook to do.

The financial position of the Society, as will be seen from the statement before you, is, I regret to say, not satisfactory. We will receive from the Government only £100 this year instead of £200 as heretofore, and in future we will not receive any grant at all, as the Government has decided not to make any provision in next year's Estimates for Grants to Agricultural Societies. There are a good many subscriptions still outstanding, and I must impress upon members the absolute necessity of paying their subscriptions, for without their support it would be impossible for us to meet our obligations.

In conclusion, I wish to offer the thanks of the Society to the judges who officiated at our recent Show and carried out their duties so satisfactorily. To the secretary and stewards my best thanks are due for the very able help rendered to myself and to the Society.

The cultivation of the Java-Natal indigo plant has of late years considerably extended in Bengal, says the *Textile Mercury*, with the result that a recent Blue-book records that the quality of the indigo produced in the province is showing marked improvement.

Experiment Farms.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

Exceptional weather has been experienced during the past month: 6.15 inches of rain were registered, although rain only fell on nine days. There was very little bright weather and it was very difficult to work the land at any time.

When practical attention was paid to the planting of tobacco about fifteen thousand plants were set out on Section D, which is now complete and all blanks have been filled up. Section F, from which peas were harvested, has been reploughed and is now ready for the reception of tobacco.

The following plots have been harvested during the month: (c-d plots) Early Cape and Zero Barley; (e-f plots) Algerian Oats; (g-h plots) Rye; and (i-j plots) Excelsior and Grey Winter Oats; together with two plots of wheat—Menenecu and Nicaragua. All the above are stacked under cover awaiting a favourable opportunity to be threshed. Only three lots have been threshed up to the present: Indian oats, Cape barley and barley-wheat. All varieties of peas have been harvested and threshed, but not yet winnowed. A second cutting has been taken from all lucerne plots. Menenecu and Nicaragua wheats have been harvested as stated above, and I think the former will thresh well. Standard Fife and Wellman Fife also give good promise. I think all cereals, especially wheat, should be sown not later than April, otherwise the harvest is brought into the middle of summer and an inferior crop is obtained.

All plots on Section A (with the exception of plots *a* and *b*, which are planted with cotton) have been reploughed and will be planted with maize. The land available for the purpose is 4 acres, and will be divided into four separate plots of 1 acre each, to be irrigated with 3, 6 and 9 inches of water respectively, with one unirrigated plot between. The rows of maize will be planted 4 feet apart, and a row of Canadian Wonder beans sown between each two rows of maize after the last cultivation about the end of January.

Some inconvenience has been caused by the cattle being attacked by the three-days' sickness (commonly called stiff-sickness); I am glad to say at time of writing all are now healthy and in good working condition.

W. HOSKING,

Curator.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

Planting operations have been in full swing during the month of November, and, although somewhat retarded by the incessant rains and packing cane for India, the principal part of the work is well in hand. Within the next month we should have under cultivation on this Farm about 100 acres each of cane, maize, *Paspalum* grass, 20 acres of beans, 10 acres of ground nuts, and various smaller sections of cow-peas, onions, potatoes, sweet potatoes, chicory, castor oil, indigo, cotton, etc.

Five thousand pineapple suckers were planted early in the month on land adjoining the manure section of pines and between the rows of fruit trees.

Five and a quarter tons of Uba cane were packed in crates for shipment to India. This proved a slow and somewhat arduous task. Crates were made 4 feet 4 inches by 2 feet by 2 feet, and 4 feet by 2 feet by 2 feet, the larger holding 700 lbs. and the smaller 600 lbs. The cane was then cut into lengths to fit the crates and sealed at each end with paraffin wax, then wrapped in paraffin paper and again wrapped in clean paper and firmly packed in the crates.

Cane has been planted in the valley below site of old nursery where citrus trees were formerly planted (about 3 acres in extent). This was also interplanted with maize. We were unfortunate in not being able to finish the whole valley owing to its being inundated with water.

The Distance of Planting Maize section was planted; and, although parts had to be replanted after the washouts, the crop is making good growth and we should again reap favourable results from it.

On the new area of 400 acres the 70 acres of cane is coming through the ground, and nearly all other work has been suspended in order to have this weeded and prepare it for planting catch crops between the rows of cane. Ten acres of maize, 5 of beans, 5 of peanuts and 3 of cowpeas have already been planted, the maize and beans being well above the ground. The balance of the 70 acres will be planted with maize when weeding is completed.

Ten sacks of *Paspalum* grass roots which you sent from Cedara have been planted on land adjoining the cane; and every root has struck and is making excellent growth.

The imported Boone County maize for breeding purposes was planted on site of old Allen's Long Staple Cotton section and is well through the ground.

Two sections of maize manure experiments have been planted, one on old chicory and arrowroot sections and one on new land prepared and planted with maize last season.

Ground nuts and sweet potatoes were also planted in pig paddocks.

the ground nuts making good growth, while the sweet potatoes are practically at a standstill.

Three bundles of White Queen cane were received from Mr. Wilkin-son, of Ottawa, and were planted out. This cane is a clean, well-matured soft one, and should be an excellent sugar producer if soil is suitable for its growth.

The three students stationed here are giving every satisfaction, carrying out their duties in a workmanlike manner and giving strict attention to all details.

The rainfall during the month was a heavy one, over 11½ inches being registered.

W. JOHANSEN,
Manager.

Gardening Notes for January.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

A FURTHER sowing of cauliflower should be made this month if a succession crop is required; also, a second sowing of brocolo. The latter succeeds better than cauliflower in colder districts of the Colony. The main sowings of the various kinds of cabbages should also be made now for the winter crop, such as Drumhead, Oxheart, Enfield Market, Winningstadt, Brussels Sprouts, Scotch Kale and Savoy.

In warm, sheltered parts where tomatoes can be successfully grown as a winter crop, the seed should now be sown. The best all-round variety for market is the Dwarf Champion, which requires little or no support from the vine, being of an upright, sturdy growth, and consequently very little or no staking is necessary. Where only small quantities are required, the Ponderosa is one of the best for winter, but it requires well staking owing to the great weight of the fruit.

Young celery seedlings sown in November should now be pricked out previous to final planting, choosing favourable weather for the operation. This is especially necessary where the seed bed is crowded. About two or three inches between the plants will be sufficient, so that each plant can be lifted with a ball of soil by means of a small fork or pointed stick. If hot, dry weather follows immediately after the operation, shade the seedlings with light litter or straw and water freely till well established.

Plant out leeks from the seed beds in well manured ground, in deep

drills or shallow trenches for the convenience of earthing. The drills may be twelve inches apart and the plants six inches apart in the drills.

Stake and tie up tomatoes as required, and give liquid manure occasionally.

FLOWER GARDEN.

In the warmer parts of the Colony most of the half hardy and tender varieties of flower seeds may still be sown for autumn flowering, including Aster, Balsam, Calandrina, Celosia, *Centaurea Americana*, *Chrysanthemum tricolor*, Cockscomb, Cosmos, Marigold, Nasturtium, Cactus Sunflower and Zinnia. In the colder districts sow hardy varieties, such as Antirrhinum, Candytuft, Aquilegia, Calendula, Coreopsis, Cornflower, Carnations, Campanula, Dianthus, Larkspur, Lupin, Mignonette, Myella, Pansy, Pentstemon, Petunia and Phlox Drummondii.

For greenhouse or window gardening sow under glass *Primula sinensis*, *Cyclamen persicum* and *Cineraria* for winter and spring flowering. The seed should be sown in shallow earthenware or metal pans. Put in a good layer of drainage of broken brick or cinders, after placing a few crocks over the hole, and then a layer of rough fibrous stuff and fill up to within an inch of the top with a compost of rich loam, leaf mould and sand passed through a fine sieve. Give a good watering and sow the seeds thinly and evenly on the wet surface. Cover thinly with the same compost and place a square of glass over the pan and cover with a sheet of brown paper to exclude the light until the seedlings come through; then admit light gradually, but care must be taken not to allow the direct rays of the sun to fall on them. When water is required, immerse the pan nearly up to the rim in water and remove soon as the surface appears moist. Avoid surface watering with water can.

Chrysanthemums should now be planted out in rich soil if not already done last month. Mulch the surface round the roots with old manure and water freely in dry weather.

Where orchards of citrus trees are being formed, the trees should be planted out this month. Avoid digging holes and deep planting. Holes in level ground collect and retain the surface drainage, which is fatal to the roots of citrus trees. On a steep hill side they may be necessary, but in this case there is natural drainage.

In addition to the orange, naartje, lemon, lime, etc., all kinds of evergreen fruit trees should be planted this month, including the loquat, guava, avocado pear, mango, Brazilian cherry, rose apple, etc.

Plant evergreen ornamental trees, flowering shrubs, creepers, etc.

Norway is a land of afforestation. It is stated that in that country no one is allowed to cut down a tree without planting three.

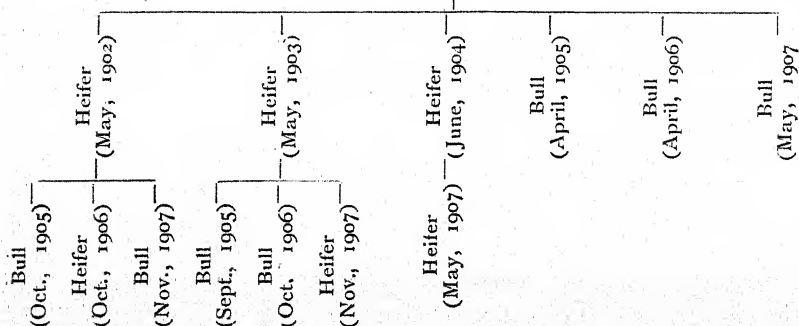
Correspondence.

A RECORD?

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR.—I send you a "tree" showing what must be pretty well a record for a cow nine years old. You will see by it that in a little more than five years she has thirteen descendants, all of which are alive.—Yours, etc.,

Cow (bought March, 1902).



W. F. B. SUTHERLAND.

MILLIPEDES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Can you, or any reader of the *Agricultural Journal*, please give a remedy against "Millipedes" (Zulu: *Tsbongololo*). I planted one bag of Early Rose potatoes last season, and they looked splendid, but when I came to take the potatoes out, I found that nearly every one was almost eaten up by these "Tsbongololos," so that I got only a few for the table, and had to feed pigs with the rest. It seems that we will have the same experience this year, although I planted none in the same garden, but a distance away, yet there are any amount of these potato pests among them.

Who knows a remedy against lameness in fowls? Our fowls seem quite healthy; all of a sudden they become lame, some recover, others die; the wet weather can hardly be the cause of it, since they were worse during last winter, when it was dry enough.

I hope you will be able to give me some information and thanking you in anticipation.—Yours, etc.,

Paulpietersburg.

A. STUMPF.

[It is impossible to make any recommendations based upon previous experience or experiments with the millipedes to which our correspondent refers. Mr. Fuller (the Government Entomologist), to whom we submitted the former of our correspondent's inquiries, states that they have been reported from time to time in various parts of the world as damaging root crops, and they seem to be abundant at particular seasons and in particular districts. In green-houses, etc., they are generally collected by putting slices of potato under boards among the pots. The creatures gather there and are collected. It has been suggested that something might be done in the field by poisoning these potatoes with strychnine. There is a poison, known as "Vapourite," on the market by the South African Fertilizers Co., for which it is claimed that it will destroy all subterranean vermin of this nature; but an opportunity of giving this a thorough trial in any particular connection has not occurred since it came on the market. If it accomplishes half of what its manufacturers claim for it, it would certainly prevent the ravages of this pest upon root crops; but we can in no way guarantee success with its use.]

Our correspondent's inquiry regarding lameness in fowls we referred to Mr. H. H. Jones-Ikin (formerly secretary of the Natal Poultry Club), who states that the lameness is primarily due to too much in-breeding, and also to too great a proportion of mealies in the birds' food. He recommends mating old roosters—that is, birds in their third year—with pullets not older than two years, and cockerels (in their first year) with hens in their third year. Soft food should be given—*e.g.*, a little bran and mealie meal—with a table spoonful of horse condition powder mixed in it once a day.]

CUT-WORMS IN MEALIES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Mr. Reid, Farm Manager, Cedara, *inter alia* remarks in the November number of the *Natal Agricultural Journal*, "Havoc is being done to young plants by cut-worms. The method adopted to kill them has been the use of a mixture of 1lb. of Paris green, 50lbs. bran, sweetened with treacle, strewn over the infected ground." My experience with cut-worm and method of prevention will, I trust, be interesting and, I hope, of service to Mr. Reid and others, as the dreaded cut-worm is a very great factor, whether one gets a good or bad crop. No land can give a good crop unless it is sufficiently planted. I am giving my experience and treatment of cut-worms for this season, although I have used the same treatment more or less for the last twelve years, and always with success.

On the 24th September last I commenced planting Early Rose potatoes. I think the cut-worm ate off quite 20 per cent. of them. Next to this patch of potatoes I had decided to plant mealies—main crop—com-

mencing early, the 5th November—1st, because this portion of the field is badly infested with red weed; 2nd, because the top grub seems to be worse of late years at the latter end of the season—that is, mealies planted from the 15th to the 25th of December—and also because I consider it a mistake to wait so long in the pink of the season before making a start to plant—the usual time in these parts being the 15th November—on account of top grub. Seeing the cut-worm was so bad in these potatoes I naturally concluded they would be in the land adjoining; therefore, instead of putting the planter on—a Champion—I drilled the land with small double mould-board ploughs and put the coolies to plant by hand, the plan being as follows: The boys take an old bath with them into the field into which they put about two buckets of mealies, then one pours coal tar—a small hole being made in the drum—on the mealies while another stirs vigorously with a strong stick until the mealies are quite black, as the mealies are taken out of the bath into the planting tins, each coolie adds some fine mould, which prevents the mealies sticking to the hand, and the planting commences. In this way we planted the whole of the field—100 acres—with the exception of a corner $3\frac{3}{4}$ acres, where the planter was used. On every portion of the field planted by hand and with tar as stated above, you could not wish for a better plant. The plants came up very strong and healthy—where we commenced the mealies are eighteen inches high now—and not a sign of the cut-worm. Neither is there, so far as I can see, any sign of top grub; but whether the tar has anything to do with this I cannot say, but I mean to experiment on those lines and find out. After this, all lands were planted with the planter and without the application of tar—as no planter I have seen will plant if tar is mixed with the seed—five fields. All these fields are more or less damaged by the cut-worm—some very badly—and three of them have been replanted. Not any of last year's stalks have been taken off any of the lands: I consider it a great waste of manure to do so. Very little of the land has been ploughed twice on account of my experience of wash last season.

I shall be pleased to give any further information I can on this matter.—Yours, etc.,

Diepe Kloof, Mid-Illovo Central,

B. B. EVANS.

17th December, 1907.

A cause of injury and source of decay of oranges is that due to leaving too long a stem when gathering the fruit. The damage that may be brought about as a result, when pouring from one receptacle to another, is obvious.

The Weather and Crops.

CONDITIONS IN NOVEMBER.

OUR reports indicate that, during the month of November, the conditions as regards rainfall were not altogether favourable throughout. Whilst some of our correspondents write that the rainfall was fairly good, others, in the New Guelderland, Darnall, Pinetown, Mid-Illovo, Himeville, Maritzburg, Krantzkop, Mudén, Greytown, Newcastle, Melmoth and Maputa districts, report the rainfall to have been excessive; whilst in the Dannhauser and Luneberg districts the fall was barely sufficient, and from the Van Reenen district "very insufficient" was reported. A very heavy fall of rain occurred practically all over the Colony on the 18th and 19th of the month, as much as 5.55 inches being registered at Stanger. At the Point, Durban, 4.20 inches fell, at Mount Edgecombe 4.83, at Winkel Spruit 3.44, at Verulam 3.50, at Port Shepstone 3.14, and Imbizana 3.15, 3.75 inches at Ottawa and Ubombo, 3.82 at Empangeni, and 3.19 at Brankholme.

A considerable number of hailstorms occurred during the month; and our correspondents at Creighton, Mudén, Krantzkop, Harden Heights, Greytown, Ladysmith, Glencoe, Newcastle, Vryheid and Eshowe, report damage done in their districts—in many cases crops being destroyed and in others orchards being injured. In the vicinity of Harden Heights considerable damage was done to wattle plantations besides other crops. We should be glad if our correspondents would kindly take particular note of the dates of the hailstorms occurring in their vicinity; as it will help materially when a study is commenced—after sufficient data have been collected—of the occurrence of hailstorms in the various parts of the Colony.

Planting operations were in several districts hampered by the excessive rain; and in some districts the young mealies had for various reasons to be re-planted. Our New Guelderland correspondent reports that, owing to the lack of ploughing facilities, considerably less cane has been planted this year.

Generally speaking the crop prospects all round are good, and there are few unfavourable reports. A good crop of wattle bark is expected, on account of the wetness of the season.

Near Maritzburg, however, the bagworm is giving trouble. The present price of bark is firm, but there is no tendency to rise. The top grub

and cut worm are rife in some districts and are reported to be doing considerable damage to mealies.

There is little improvement to be noted in the live stock market, so far as our reports go to show. Prices of eggs and poultry are low with the exception of a few districts; and those of milk and butter appear to be falling.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the principal South African markets during the month of November-December, have averaged as follows:—

NATAL.

PIETERMARITZBURG.

The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock—Fowls, 2s; ducks, 2s 3d; turkeys: cocks 12s, hens 5s 6d; guinea-fowls, 3s; rabbits, 1s 6d.

Animal Produce.—Bacon, 6d per lb; ham, 9d per lb; pork, 5d per lb; lard, 8d per lb; eggs, 1s per doz; butter, 1s per lb; cheese, 8d per lb; honey, 6d per lb.

Vegetable Produce.—Beans, 12s per 100 lbs; buckwheat, 11s 6d per 100 lbs; barley (grain), 10s per 100 lbs; amadumbe, 6s per muid; earth nuts, 10s per muid; forage: barley £2 10s per ton, oats £1 10s per ton; hay, £2 per ton; kafir corn: amabela 5s 6d per 100 lbs, geba 4s per 100 lbs; lucerne, 4s per 100 lbs; mealies, 5s per 100 lbs; Japanese millet (grain), 4s per 100 lbs; onions, 15s per 100 lbs; peas, 8s per 100 lbs; potatoes, 4s 6d per 100 lbs; sweet potatoes, 2s 6d per muid; wheat (grain), 11s 6d per 100 lbs; bananas, 1s per 100; oranges, 2s 6d per 100; naartjes, 2s 6d per 100; lemons, 1s 6d per 100; plums, 2½d per lb; prunes, 5d per lb.

DURBAN.

The Market Master reports the following average prices realised during the month ended 15th December:—

Live Stock and Animal Produce.—Sucking pigs, 5s 6d; fowls, 1s 8d; ducks, 2s 5d; turkeys, 10s; rabbits, 1s 2d; bacon, 5d per lb; eggs, 1s 2d per doz; butter (good), 1s 1d per lb.

Vegetable Produce.—Earth nuts, 8s per muid; mealies, 10s per muid; potatoes, 7s per muid; sweet potatoes, 5s per muid; bananas, 1s per 100; oranges, 4s 6d per 100; Spanish lemons, 3s 6d per 100.

TRANSVAAL.

JOHANNESBURG.

Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, representing the farmers' co-operative associations of the Cape Colony, has furnished the following prices realised on the Johannesburg market during the week ended 20th December:—

Live Stock.—Oxen: slaughter £8 to £17 each, dressed £1 19s to £2 2s per 100 lbs; sheep: slaughter lambs 15s to £1 4s 6d each, dressed 5d to 5½d per lb; pigs, 3d to 4½d per lb, live weight; Boer goats, 10s to 22s 6d; cows (milk) £15 to £38; donkeys, £6 to £8; mules, £14 to £22; fowls, 1s to 2s 6d; ducks, 1s 6d to 2s 9d; turkeys: cocks 8s to 18s, hens 4s to 6s; geese, 4s 6d to 6s.

Animal Produce.—Butter, 9d to 1s 3d per lb; eggs, per doz: new laid 1s 9d to 2s 3d, fresh 11d to 1s 2d.

Vegetable Produce.—Bran, 6s 9d to 7s per bag of 100 lbs net; barley, 6s 3d to 9s 6d per bag of 150 lbs net; beans (dry), 15s to 25s per bag of 200 lbs net; chaff, 2s 3d to 3s 3d per 100 lb; forage, 3s 6d to 5s 9d per 100 lbs; kafir corn, 13s 6d to 14s 9d per bag of 200 lbs net; lucerne (dry), 3s 6d to 4s 9d per 100 lbs; manna, 2s 3d to 3s 6d per 100 lbs; mealies, 7s 6d to 8s 6d per bag of 200 lbs net; onions, 9s to 22s 6d per bag of 120 lbs net; oats (seed), 8s to 11s 6d per bag of 130 lbs net; potatoes, 4s to 8s per bag of 150 lbs net; bananas, 2s to 3s per 100; grenadillas, 1s per 100; oranges, 7s to 8s per 100; pineapples, 2s to 3s per doz.

ORANGE RIVER COLONY.

BLOEMFONTEIN.

The Bloemfontein *Weekly Post* publishes the following prices realised on the Bloemfontein market on Saturday, 14th December:—

Live Stock and Animal Produce.—Fowls, 1s 6d to 2s 3d; ducks, 2s to 2s 3d; geese, 6s; turkeys, 5s to 10s; dressed fowls, 2s to 2s 9d; fresh eggs, 1s 3d to 1s 4d per doz; butter, 1s to 1s 3d per lb; mutton, per hind quarter 4s 6d to 5s 6d, per fore quarter 2s 6d to 3s 6d; pork, 6d per lb; beef, 6d per lb.

Vegetable Produce.—Oat hay, 4s 6d to 5s per 100 lbs; chaff, 7s to 8s 6d per bale; kafir corn, 13s 6d to 14s 6d per bag; mealies, 9s to 10s per bag; barley, 6s 3d to 6s 9d per bag; bran, 7s per bag; onions, 12s to 16s per bag; potatoes, 10s to 17s 6d per bag; oranges, 5s to 7s 9d per 100; pineapples, 1s 6d to 2s 6d per doz.

KIMBERLEY.

Messrs. Jas. Lawrence & Co., Ltd., P.O. Box 301, Kimberley, report as follows:—

Meal and flour, no alteration to report. Mealies firm. Kafir corn good: white wanted. Oats plentiful and cheap. Oathay, the price is very

low both old and new seasons. Bran, cheap. Onions firm, slightly higher than last week. Potatoes, good demand for best quality. Eggs, fair demand. Butter, good first-class butter enquired for. Fat poultry, good demand for all kinds. Vegetables, market over supplied at present. Choice fruit, good demand for first-class quality. Live stock, very little doing in this line; no sale for pigs.

Live Stock.—Oxen: good prime, 600 lbs upwards, £10 to £15; cows (good), 450 lbs upwards, £5 10s to £8; calves, 5½d per lb dead weight; trek oxen, £7 to £8; pigs, 100 lbs (clean), 3d to 3½d per lb, live weight; lambs, 30 lbs, 11s to 13s; hamels, 40 lbs to 45 lbs, 14s to 17s; Cape sheep (good), 14s to 17s; kapaters (good), 14s to 17s; riding horses, £10 10s to £27 10s; draught horses, £10 to £25; mares, £10 to £25; ducks, 3s to 3s 9d; fowls, 1s 6d to 2s; turkeys, 7s to 15s.

Animal Produce.—Butter: fresh 1s to 1s 4d per lb; second quality 9d to 11d per lb; eggs, 10d to 1s 1d per doz; hams and bacon, 5d to 8d per lb.

Vegetable Produce.—Bran, 6s to 7s per bag 100 lbs; barley, 7s 6d to 12s per bag 163 lbs; beans: sugar 30s to 40s, kafir 15s to 17s 6d, per bag 203 lbs; chaff (colonial), 6s 6d to 12s 6d per bale, 3s 3d to 4s per 100 lbs pressed; forage: good 5s to 6s, inferior 3s 6d to 4s 6d per 100 lbs; kafir corn: mixed 9s 6d to 11s, white 14s 6d to 16s; Boer meal: unsifted 28s to 29s 6d, sifted 28s to 32s; mealies, per 203 lbs: yellow 9s to 10s 3d, white (hard) 9s to 10s; mixed 8s 9d to 9s 9d; white mealie meal, 11s to 12s per 183 lbs; Cape oats, 9s to 10s 6d per bag 150 lbs; lucerne hay, 3s 6d to 5s per 100 lbs; onions, 12s to 16s per bag 120 lbs; potatoes, 3s to 6s, new 9s to 14s; wheat, 20s to 24s per bag 203 lbs; walnuts, 4d to 6d per lb; dried peaches, 2d to 6d per lb; dried apricots, 2s to 5s per lb; naartjes, 4s to 6s per 100; oranges, 4s 6d to 9s 6d per 100; lemons, 1s 6d to 3s per 100; pineapples, 3s to 4s per doz.

WOOL, MOHAIR, ETC.

Messrs. W. Dunn & Co., Durban, in the course of their report on wool, mohair, etc., write:—

Wool.

Latest private cable advice to hand state Snow Whites have declined 1½d, Combing Grease 1d, and Short Wools 1d to 1½d, as compared with last sales closing rates. We do not, however, expect this change will affect the present state of our local market very much, as buyers anticipated this drop. Short and heavy wools are neglected. Supplies at present are easing off for the time being. We quote:—

Transvaal and West O.R.C.

Good long light, 12 months, 7d to 8d; average ditto, 6½d to 7½d; heavy inferior ditto, 5½d to 6½d; superior short clean, 6½d to 7½d; earthy heavy ditto, 5d to 5½d.

Harrismith and Vrede District.

Good light, 12 months, $7\frac{1}{2}$ d to $8\frac{1}{4}$ d; average length ditto, $6\frac{1}{2}$ d to 7d; short clean, 6-9 months, $6\frac{1}{2}$ d to 7d; heavy inferior, 12 months, 6d to $6\frac{1}{2}$ d; earthy heavy, $5\frac{1}{2}$ d to $5\frac{3}{4}$ d; average fair ditto, 6d to $6\frac{1}{4}$ d.

NATIVE WOOLS.

Basutoland, $6\frac{1}{4}$ d to $6\frac{3}{4}$ d; East Griqualand, $7\frac{1}{2}$ d to $8\frac{1}{4}$ d.

MOHAIR.

There is very little of this staple coming forward. The market remains very quiet, and no business whatever has been done this week.

We quote: Superior long sorted O.R.C. and Transvaal, $12\frac{1}{2}$ d to 13d; fair average, $11\frac{1}{2}$ d to 12d; mixed, 10d to $10\frac{1}{2}$ d; coloured and kempy, 7d to 8d.

HIDES AND SKINS.

Hides.—Superior sun-dried, 5d to $5\frac{1}{4}$ d; damaged, 4d to 5d; salted, $4\frac{3}{4}$ d to $5\frac{1}{4}$ d.

Sheep Skins.—Sound skins are quoted at $5\frac{1}{4}$ d to $5\frac{3}{4}$ d; damaged, $3\frac{1}{4}$ d to $3\frac{3}{4}$ d; average, $4\frac{1}{2}$ d to 5d; mixed parcels, 4d.

Goat Skins.—Sound skins, 4d to 5d; average, 3d to 4d.

Angora Skins.—Sound, $2\frac{1}{2}$ d to 3d; damaged, $1\frac{1}{2}$ d.

General Christiaan Rudolf de Wet has been appointed Minister of Agriculture for the Orange River Colony.

Apples should be harvested while they are still firm, remarks the *Canadian Horticulturist*. In this way only can the finest flavour and keeping qualities be obtained. It is poor economy to store bruised fruit, because it not only fails to keep but it will decay other fruit that is put away sound. The keeping qualities of apples can be greatly prolonged by wrapping them in ordinary paper, with wax paper outside.

“There is nothing the American farmer can do that you cannot do if you choose. It is just the same with the Australian farmer. There is nothing that the Australian farmer can do with his wool that you cannot do, and what we have all got to work for is that there shall be no farmer, either in America or Australia, or anywhere else, who does better with his land than the Transvaalers.”—*Lord Selbourne at Potchefstroom.*

The Oversea Maize Market.

THE POSITION IN NOVEMBER.

FOR the following information regarding the state of the London market in November we are indebted to the weekly issues of *Beerbohm's Evening Corn Trade List*.

Throughout practically the whole of November the market appears to have been very dull. During the last week for which we have particulars—ending November 22nd—prices had gone down as low as 24s. 10½d. to 25s.—which was accepted for La Plata steamer nearly due. Higher prices, however, were being asked on the 22nd, and the market showed less depression.

“Apart from the depressing influence of the financial position in America, it is not easy to understand,” says the *Corn Trade List* in its issue of the 1st November, “the extreme weakness of this article [maize]. There is very little or no improvement in the Roumanian crop prospects, and none in the outlook of the American crop, whilst the Argentine surplus shows evident signs of approaching exhaustion. The *Times of Argentina*, of September 30th, expressed the opinion that there was then very little maize left in the country, and since then nearly a million quarters have been exported. We have for some time held the opinion that the high prices had drawn out this year's surplus at a far greater rate than usual, and it is not improbable that the exports will come to a somewhat abrupt conclusion much earlier than many expect. It has been reported this week, indeed, that some Nov.-Dec. contracts have been cancelled. The present week's shipments are cabled as 114,000 qrs., against 151,000 qrs. last week, and 243,000 qrs. in the corresponding week last year; and our correspondent adds that the inland movement is now small.”

THE AMERICAN CROP.

Estimates of the yields in the big surplus-producing maize States indicate a shortage in these States of 284,000,000 bushels as compared with the previous year, and of 211,000,000 bushels as compared with the yield of 1905. The exports from the present year's crop will not, of course, assume any real importance until January and February; and even then, with so largely a reduced crop, they may be expected to depend upon the price obtainable. With little to come forward from La Plata until the new crop is available next May, it becomes highly probable that the supplies in the next three months may gradually decline to a very low point. Writing on the 15th November, the *Corn Trade List* says that

business in new American corn for Dec.-Jan.-Feb. shipment, which by that date last year had been quite brisk, at 19s. to 19s. 6d. for London and Liverpool, had so far been very small, although 25s. 3d. c.i.f. London was obtainable for Dec.-Jan. shipment. "It is always a difficult matter to suggest what surplus for export may exist in America; it largely depends upon the price obtainable; and 25s. may certainly be called an attractive level. For the past three years, as will be seen above, the crops have averaged 315 million quarters, and the exports 11½ million quarters; this year's crop is given as 298 million quarters, but what the exports in the coming season may prove to be depends, as we have said, largely upon prices; what seems tolerably certain is that we shall be largely dependent upon America for supplies during the first four or five months of next year."

NATAL MAIZE IN LONDON.

In the same issue (15th November), the *List* writes, *re* Natal mealies:

"A new source of supply has lately made itself felt, viz., Natal; some very fine samples of both White and Yellow corn have lately been received in London, and there is, we believe, a fair quantity still to come; the value is about 27s. landed, whilst for shipment 25s. c.i.f., bags included, is quoted."

STATISTICS.

The general statistical position of maize on the 22nd November was as follows:—

			1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	..	...	665,000	895,000	640,000
, , Cont.	...	...	440,000	1,225,000	675,000
Imports into U.K. for the 46 weeks ending					
Nov. 16	...	...	11,030,000	9,811,700	8,874,200
Visible supply in U.S. (<i>Bradstreet's</i>)	...	...	781,900	685,300	763,500
			1906-7	1905-6	1904-5
American crop	...	...	340,000,000	316,000,000	285,000,000
			1907.	1906.	1905
New York, Spot	...	...	66½c	53½c	55½c
Mark Lane, La Plata landed	...	...	26/0	20/6	25 0

SHIPMENTS OF MAIZE TO EUROPE FROM JANUARY 1ST TO DATE.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America ...	3,623,000	4,034,000	3,922,000	5,961,000	4,403,000	5,517,000
Argentina ...	3,515,000	1,915,000	5,627,000	4,799,000	6,057,000	3,438,000
Russia ...	1,483,000	2,109,000	177,000	300,000	222,000	541,000
Danube, etc.	2,444,000	3,872,000	454,000	1,240,000	143,000	154,000
Total	11,065,000	11,930,000	10,180,000	12,300,000	10,825,000	9,650,000

* Includes shipments for orders.

Manures on the Natal Market, Season 1907.

NAME OF MANURE.	PHOSPHORIC ACID.										Estimated Total Value of Manure per Ton (2,000 lbs.) Durban.	Price asked per Ton of 2,000 lbs. f.o.r. Durban.																																																																																																																																																																																																																																																															
	NITROGEN.		Water Soluble.				Citrate Soluble.		Citrate Insoluble.				TOTAL.		POTASH.																																																																																																																																																																																																																																																												
			Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.			Per Cent.	Value in One Ton of Manure.																																																																																																																																																																																																																																																													
	£ s. d.	£ s. d.													£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.																																																																																																																																																																																																																																																							
<i>Nitrogenous:</i> Sulphate of Am- monia Nitrate of Soda do. do. Nitrate of Pot- ash "Nitrate" of Lime	20'73 16'06 16'02 15'51 13'58 17'35	16 12 12 12 10 13	1 14 13 5 15 8	4 3 8 7 0 11	...	£ s. d.	£ s. d.	£ s. d.	...	£ s. d.	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16 12 12 12 22 13	1 14 13 5 19 8	4 3 8 7 19 11	16

Superphosphate (High Grade)	...	16'01	4 9 5	1'23	0 5 2	0'51	0 1 5	17'75	4 16 0	...	...	4 16 0	4 17 6f
Superphosphate (Ordinary)	...	14'98	4 3 7	0'62	0 2 7	0'36	0 1 0	15'96	4 7 2	...	...	4 7 2	4 10 3e
do.	...	13'74	3 16 9	2'05	0 8 7	0'96	0 2 8	16'75	4 8 0	...	...	4 8 0	...
Dissolved Bone Compound	1'02	0 13 1	2 15 4	1'25	0 5 3	2'52	0 6 1	13'68	3 7 6	...	...	4 0 7	6 3 6e
Bone Flour	1'37	0 15 9	...	9'05	1 17 9	23'83	3 5 6	32'88	5 3 3	...	...	5 19 0	6 0 ob
Bone Flour (Steamed)	1'27	0 14 7	...	7'37	1 10 9	24'97	3 8 8	32'34	4 19 5	...	...	5 14 0	5 14 oe
Bone, Ground...	4'05	2 6 7	...	4'15	0 17 4	20'41	2 16 1	24'56	3 13 5	...	...	6 0 0	6 0 ob
do.	3'99	2 5 11	...	5'64	1 3 6	17'97	2 9 5	23'61	3 12 11	...	...	5 18 10	6 4 2h
do.	3'02	1 14 9	...	3'45	0 14 5	16'37	2 5 0	19'82	2 19 5	...	...	4 14 2	6 4 2i
Basic Slag	...	...	...	10'56	2 12 10	11'56	2 3 4	22'12	4 16 2	...	...	4 16 2	4 10 ob
do	...	...	...	10'68	2 13 5	8'66	1 12 6	19'34	4 5 11	...	...	4 5 11	4 2 6a
do	...	...	...	8'65	2 3 3	9'31	1 14 11	17'96	3 18 2	...	...	3 18 2	3 19 6c
Potassic:													
Muriate of Pot-	...	...	...	...	...	...	...	...	...	60'32	14 1 6	14 1 6	13 10 ob
ash	...	...	...	...	...	...	...	...	...	...	...	...	...
Muriate of Pot-	...	...	...	...	...	...	...	...	...	57'80	13 9 9	13 9 9	13 15 oa
ash	...	...	...	...	...	...	...	...	...	...	...	...	...
Sulphate of Pot-	...	...	...	...	...	...	...	...	...	50'72	13 19 0	13 19 0	13 15 oa
ash	...	...	...	...	...	...	...	...	...	...	...	...	...
Sulphate of Pot-	...	...	...	...	...	...	...	...	...	50'61	13 18 4	13 18 4	13 10 ob
ash	...	...	...	...	...	...	...	...	...	...	...	...	...
Nitrate of Pot-	13'58	10 15 0	...	...	...	...	...	...	...	44'47	12 4 7	22 19 7	21 0 ob
ash	...	...	...	...	...	...	...	...	...	12'65	2 19 0	2 19 0	2 17 6c
Kainit	...	...	...	...	...	...	...	...	...	...	...	...	...
Complete:													
Potato	5'04	3 16 7	9'50	2 13 1	2'61	0 8 5	1'20	0 3 4	12'71	3 4 10	4'32	1 0 2	8 1 7
do	2'72	2 1 10	7'52	2 2 0	3'35	0 14 0	2'48	0 6 10	13'35	3 2 10	3'71	0 17 4	6 2 0
Root Guano	2'46	1 17 10	8'74	2 8 10	0'25	0 1 0	3'64	0 10 0	12'63	2 19 10	3'72	0 17 4	5 15 0

NAMES OF SELLERS.—a—Henwood, Son, Soutter & Co. b—South African Fertilizers Co. c—Steel, Murray & Co. d—F. & G. Reiche.
e—J. Raw & Co. f—W. Dunn & Co. g—Natal Chemical Syndicate, Ltd. h—H. C. Foss & Co., Ladysmith. i—Geo. Telfer.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of November, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons. Cwt
Natal Navigation ..	34	88	295	22	327	257	2	9	3	27,618 15
Elandslaagte ..	21	24	309	20	217	560	—	3	8	18,486 0
Glencoe, Natal ..	13	114	65	11	486	33	—	—	—	16,762 16
Dundee Coal Co. ..	23	13	211	14	70	321	2	—	18	16,324 15
Durban Navigation ..	26	176	53	11	412	73	—	—	—	15,646 0
Natal Cambrian ..	14	39	171	9	309	98	6	6	2	13,193 15
St. George's ..	19	80	111	13	244	147	—	—	—	12,960 0
South African ..	11	8	133	12	218	29	5	26	23	12,908 0
Newcastle ..	10	44	26	8	316	2	3	13	—	7,697 17
Natal Steam Coal Co. ..	4	45	2	2	165	3	2	20	1	3,601 15
Ramsay ..	4	10	49	4	100	112	2	20	11	3,150 11
West Lennoxton ..	5	3	61	2	24	106	—	—	—	2,709 8
Central ..	8	62	12	5	161	8	—	—	—	2,233 4
Zululand ..	4	33	—	2	51	—	1	—	—	829 0
Vryheid† ..	1	2	—	1	3	—	—	8	—	22 10
Vaalbank† ..	—	—	—	2	8	—	2	—	—	8 0
Dumbi Mountain ..	1	1	—	—	—	—	—	—	—	3 0
Totals	198	742	1,498	138	3,141	1,749	27	105	66	154,155 6
Corresponding month, '06	158	710	1,344	121	2,643	1,497	49	191	314	110,862 11

* Cost charged to Capital Account.

† Includes October Return.

‡ October Return.

Maritzburg,
9th December, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of November, 1907 :—

	Tons.	Cwt
Bunker Coal ...	72,650	19
Exported to :—		
East London ...	5,463	17
Algoa Bay ...	3,899	5
Cape Town ...	19,964	12
Port Nolloth ...	154	0
Delagoa Bay ...	10	0
Beira ...	93	11
Tulcar ...	754	19
London ...	9	0
Bombay ...	8,261	1
Total ...	111,261	4

Custom House, Port Natal,
2nd December, 1907.

GEO. MAYSTON,
Collector of Customs.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of November, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rain- fall in 1 day.		Total for Year from July 1st, 1907.	Total for sameper'd from July 1st, 1906.	
	Maximum	Minimum					Fall.	Day.			
Observatory ..	77.3	62.9	88.9	58.7	7.69	21	2.00	23rd	15.31	14.91	
Stanger ..	80.3	61.6	108	50	10.86	26	5.55	18th	18.26	17.75	
Vervium ..	84.2	63.3	104	57	9.37	14	3.50	18th	16.47	12.97	
Greytown ..	77.5	48.2	95	42	6.51	21	1.69	19th	13.42	11.56	
Newcastle ..	83.6	56.2	94	46	5.48	10	1.82	18th	13.31	15.89	
Ndwedwe ..	71.7	58.3	87	53	5.78	19	2.32	19th	13.55	15.95	
Estcourt ..	81.9	53.8	100	46	3.38	13	1.25	19th	8.93	8.01	
Bulwer ..	—	—	—	—	7.26	23	2.27	18th	14.70	—	
Mid-Illovo ..	73.3	54.6	96	48	10.51	22	2.55	18th	17.86	14.45	
Impendhle ..	69.3	47.1	88	36	7.46	18	2.81	18th	13.54	12.02	
Port Shepstone ..	76.5	53.0	88	45	9.77	11	3.14	18th	15.24	15.11	
Umzimto ..	87.8	53.1	96	50	9.59	11	2.62	19th	14.60	18.23	
Richmond ..	75.0	52.9	93	43	9.72	18	2.42	18th	16.88	12.86	
Maritzburg ..	77.0	55.1	96	46	7.88	21	2.24	18th	13.91	15.97	
Howick ..	74.7	53.6	97	47	7.77	18	1.54	27th	13.48	15.11	
Dundee ..	82.1	55.0	93	42	4.84	7	1.56	18th	11.75	11.39	
Weenen Gaol ..	88.2	55.6	106	48	5.47	13	1.50	15&18	9.64	9.87	
New Hanover ..	78.6	56.2	95	49	7.38	18	2.53	18th	16.15	19.80	
Krantzkop ..	77.9	—	92	—	6.92	19	2.80	18th	—	—	
Vryheid ..	82.8	55.2	112	48	5.08	12	1.45	17th	12.69	12.84	
Nqutu ..	74.9	52.5	88	43	5.33	17	1.38	22nd	10.84	—	
Mfunzini ..	79.7	56.0	98	46	11.53	18	2.65	18th	24.86	—	
Ubombo ..	77.7	61.9	89	50	10.08	19	3.75	18th	16.72	20.68	
Point ..	—	—	—	—	10.84	19	4.20	22nd	18.70	16.87	
Ingwavuma ..	—	—	—	—	5.44	13	1.25	27th	12.32	—	
Mahlabatini ..	78.6	47.4	90	40	7.78	15	2.40	18th	14.66	13.37	
Empangeni ..	79.3	62.2	96	55	9.46	15	3.82	18th	17.70	16.22	
Anatikulu ..	82.9	60.7	104	56	7.90	18	2.65	18th	12.57	13.11	
Imbizana ..	—	—	—	—	10.43	9	3.15	18th	15.17	—	

Meteorological Observations taken at Private Stations for Month of November, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).						
	Minimum for Month.	Maximum for Month.	Total for Month.	No. of Days.	Heaviest rain- fall in 1 day.		Total for Year from 1st July, 1907.	Total for same period from July 1906.	
					Fall.	Day.			
Nottingham Road	—	—	9.99	19	1.99	18th	17.77	—	
Adamshurst (Wm. Adams) ..	90	47	7.51	14	2.50	18th	12.42	12.21	
P.M.B., Town Bush Valley ..	—	—	9.67	18	2.74	18th	17.39	20.60	
Ottawa	—	—	10.01	13	3.75	19th	15.99	15.33	
Mt. Edgecombe (Natal Estates)	—	—	12.48	18	4.83	23rd	19.83	16.86	
Cornubia	—	—	10.92	—	—	—	14.70	17.86	
Milkwood Kraal	—	—	10.10	—	—	—	13.15	13.42	
Blackburn	—	—	10.32	—	—	—	13.62	13.55	
Saccharine	—	—	10.87	—	—	—	14.23	14.66	
Equeefa (W. Hawksworth) ..	100	59	12.72	13	2.58	19th	19.17	21.77	
Umzimto, Beaveva	—	—	13.14	14	2.49	19th	13.57	21.35	
Harden Heights	—	—	5.92	14	2.08	18th	11.72	—	
Riet Vlei	—	—	5.13	13	1.43	19th	11.07	8.65	
Dalton (Fawn Leas P.O.) ..	—	—	7.22	18	2.86	18th	13.61	13.30	
Branxholme	—	—	13.49	20	3.19	18th	26.08	25.08	
Cedara—Hill Station	93	42	8.43	12	2.52	18th	13.14	14.85	
Vlei Station	92	40	8.70	13	2.25	18th	13.04	—	
Winkel Spruit	93	56	10.67	13	3.44	22nd	13.61	14.84	
Weenen	99	46	6.15	9	1.70	15th	—	—	
Giant's Castle	77.1	48.3	4.04	13	0.64	23rd	9.19	8.91	

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith	Scab	W. Anderson ..	Netherby
		"	Jimze ..	Rosboom
		"	Mapelwana ..	Roodepoort
		"	W. M. Buys ..	Ruit Kuil
		"	F. Colling ..	Klipdal
		"	H. N. Nel ..	Catharine
		"	Ingetenga ..	Roodepoort
		"	J. van de Bosch ..	Ruther Glen
		"	C. F. Marais ..	Onbekend
		"	H. Dicks ..	The Cave
		"	Mrs. W. Gibson ..	Breezie Braes
		"	A. J. G. Od ..	Matwana's Hoek
		"	Strinera Ka Yabya	Tiliz Hill
		"	Kinisenika	
J. E. Cooper	Nkandhla & Nqutu	"	Makwangqa	Selutshana
		"	Legudhla Mnd	Nqutu Hill
		"	Gacaweni Chief ..	Sandheawana
		"	Makuba U. life ..	Haladu
		"	Menezi Kamadagata	Kwondeka
		"	Boy ka Matato ..	Nqutu Loot
		"	Pelt ..	Nqutu
		"	Lerazake Leputza ..	Maefethling
		"	A. bela Kuzeizili	
		"	Msinango Butelezi	Selutshana
		"	Sekwata Ngobeze ..	Nqutu
		"	Lepondo and others	Blazagaza
		"	Madwo and others	
		"	Guzi Ka Mfeka ..	"
		"	Lekemga ..	
		"	Mpitipiti ..	Sandheawana
		"	Dak sele ..	Selutyema
		"	Somtonfo Ngobeze	Malagato
		"	Dabeni Mquba ..	Mweni
		"	Jabez Mbata ..	Nqutu Town
		"	Albert Selepe ..	Magubeni
		"	Leyarha Sondetzi ..	Nkandi
		"	Letuza Mlefe ..	Ncenceni
		"	Letuza Mlefe ..	Haladu
		"	Lunwy za Sondelzi	Nkanani
		"	Kanyiza Ntombelha	Magogo
		"	Mishaki Butelzt ..	Nqutu
		"	Mbanko Dubenzana	Telesi Hill
		"	Mhlawafa Mhlobo	Mkanjalo
		"	LefablaSelepe ..	Nqutu
S. A. Brown	Underberg	"	J. A. Stone ..	
		"	T. de C. Arbuckle ..	Kerridge
		"	B. Phipson ..	Swathcampbell
		"	M. Fraser ..	Winterhoek
		"	R. C. Gold ..	Woodend
A. B. Koe	Portion of Estcourt	"	J. R. Royston ..	Greenend
		"	J. van Whye ..	Silburn
		"	F. A. Hathorn ..	Saagiana
		"	T. Palframan ..	Slogoma
		"	F. R. M. or ..	Greystones
A. J. Marshall	Dundee	Lungsickness	W. C. Stockil	Gleni
		Scab	Messrs. Smit & Cartwright	Springfield and Thornley
E. Varty	Western. Umvoti	"	J. W. de Br. yas	Rooifontein
		"	C. J. Pieters ..	Zwaartwater
		"	C. P. Cronje ..	Kilburn
		"	C. A. Charlwood ..	Crugieburn
		"	T. J. Nel ..	Alt. magistia
J. J. Hodson R. Mayne	Ptn of Lion's River Krantzkop	"	J. P. Van Rooyen	Un'edunt
		Lungsickness	G. Woodhouse	Halliwe
		"	Magamganse ..	Loos Hoek
		"	Uqupu ..	Myonizwe's Locat'n
		"	Ndabane ..	"

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—continued.

STOCK INSPECTOR	DISTRICT.	DISEASE.	OWNER.	FARM.
R. Mayne ..	Krantskop ..	Lungsickness	S. Johnson & Co. ..	Inadie Store
		"	Ndabane ..	Myoniezwe's Locat'n
		"	Natives ..	Myoniezwe's Locat'n
		"	Amosi ..	
A. H. Ball ..	Weenen ..	Scab	Nkabi and others..	Lootshoek
G. Daniell ..	Vryheid ..	"	Vunyo and others..	Elena Berg
		"	L. J. & T. C. Lotter	Waterfall
R. Mayne ..	Eastern Umvoti ..	Lungsickness	Nkanyeze ..	Mooiplants
		Scab	Zimbata ..	Nootgedacht
J. Burton ..	Portion of Est.-ourt	"	Nkabi and others	Loots'Hoek
J. Stewart ..	Bergville ..	"	P. Mare ..	Speculation
		"	J. Phipps ..	Littlecote
		"	J. Bester ..	Abergeldie
		Lungsickness	G. L. Coventry ..	Earby
		"	G. W. Horton ..	Hortonradford
		"	Macomi ..	Woodford
R. Wingfield Stratford	Newcastle ..	Scab	Lunaba ..	Hor onradford
		Lungsickness	J. McDuling ..	Sampson
J. G. Speirs ..	Impendh'e ..	Scab	Umloyi ..	Vrede
A. Brown ..	Polela ..	"	Pinda, Vete & Sobuon	Furth
		"	Mahlali ..	Stoffetown
		"	F. J. Livingstone ..	Fernbank
		"	H. Cole ..	Cameron
		"	P. J. Venter ..	Everfair & Spring- holmes
L. Trenor ..	Harding ..	Lungsickness	Madunckana ..	Tridale
		"	Yanyan ..	Mlo shwa
		"	G. Daddy ..	Harding Commonage
C. T. Vaughan ..	Paulpietersburg ..	"	J. D. Van Colles ..	Schurweberghoek
B. Klusener ..	Port Shepstone ..	"	G. Daddy ..	Sugar Bush Cutting
		"	Mbontshe ..	Isotsha

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
Nseleni ..	Markwa Mountain.	H. Lexton ..	Newcastle
Abbott Bros. ..	Mooi River	Pinda, Vete & Sobuon ..	Impendh'e

Before sending eggs to market, be sure to see they are clean, and, of course, they should be fresh. That is the only way to ensure the top price for them.

"If hens have the run of the citrus orchard," writes Geo. P. Hall, in the *Pacific Fruit World*, "they are a help to keep the land scratched up, and supply, in the shape of fertilizer, the condensed fertilizer they change from the feed you supply them."

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:—

ON THE 2ND JANUARY.

Creighton—(1) White ewe goat and kid. (2) Black ewe goat and kid. (3) Black-and-white goat.

Finchley (Ixopo Division)—Black bull. Probable value, £5. Impounded on the 22nd November, 1907, by Mr. T. F. Remfrey.

Hope Farm (Newcastle Division)—(1) Three wethers, merino; left ear slit; branded M on off side. (2) Wether, no ear marks, branded heart on off side. (3) Bay mare, about 14 hands, no brands, with dark brown filly foal. (Reported on 24th October, by Mr. H. J. Hearn, "Blackmoor," as too wild to be driven to the Pound.)

ON THE 8TH JANUARY.

Finchley (Ixopo Division)—Black ox, slit back of right ear.

Hilton Road—Brindle heifer, yearling, no brand visible at distance. (Reported by Mr. Porritt, of Howick Rail, as running on his farm "Vearsdale," Umgeni, on the 28th November, and being too wild to drive to the Pound.)

ON THE 15TH JANUARY.

Creighton—(1) Two black ewe goats. (2) Two black-and-tan ewe goats. (3) Red ewe goat.

Greytown—(1) Running on Mr. Newmarch's farm, "White Cliffe," as on the 1st December, 1907, and reported by Mr. Jim Browning as being too wild to be driven to the Pound: Black cow and calf, calf 18 months old. (These animals cannot be removed owing to East Coast Fever restrictions.) (2) Running on Greytown Town Lands, as on the 1st December, 1907, and reported by Mr. Allan Duff, Town Clerk, as being too wild to be driven to the Pound: (a) Black-and-white cow, 8 years old, no brands, one horn broken. (b) Red-and-white calf, 14 months old.

Ingogo—Bay colt, no marks. (Impounded by Mr. J. W. O'Reilly-Gordon, Newcastle.)

Krantskop—He-goat, no marks. (Impounded by Native Nyamasi, Makebela Location.)

Solferino (Gourton, Estcourt Division)—Blue cow, no tail; tip cut off left ear, piece cut out of back of right ear; forward horns; no brands.

ON THE 5TH FEBRUARY.

Harding—Black ox, no brands, horns turned down. (Impounded by Native Mlotshi on the 30th September.)

Mooi River—(1) Two white boar pigs, about 4 months old, no marks. (2) White sow, four months old, no marks. (3) Black-and-white sow, 4 months old, no marks. (4) Running on the farm "Falkirk," and too wild to be driven to the Mooi River Pound: Chestnut yearling colt, white strip on face, no brands. (Information by Mr. R. Paxton)

Mtunzini—Bay gelding, 14.2, blaze on forehead, near forefoot white, both hind feet white, branded 2 on near hind quarter. (Found straying and impounded by a Native.)

According to the *Natal Review* the Cape Government Railway will take 113,400 tons of coal from Natal next year, of which 78,600 tons are destined for Capetown, 24,000 for Algoa Bay, and 10,800 for East London.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor, and C. A. Holwell. Hon. Secretary and Treasurer: H. C. Hitchins. Committee: C. M. Etheridge, R. Fann, J.P., V. Hitchins, S. Aitchison, J.P., W. B. Bethman, Dr. Case, J.P., H. Rathman, R. G. Mack, J. Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

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DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Boehmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schaefermann. Hon. Sec. and Treasurer: Frank J. Volek.

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GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: J. Campbell. Vice-President: A. W. Smallie. Hon. Secretary and Treasurer: R. J. Hearn. Committee: G. Queddon, T. P. Smith, W. A. Helmer, Thos. Brookes, N. Glutz, Wm. Craig, W. R. Quedd, J. A. Brookes, W. T. Heslop, Thos. Dewar, F. Turton, W. H. Latham, A. E. Norman, D. P. Campbell.

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MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford, J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. O. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R. Garland; Vice-President: C. B. Lloyd; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: H. B. Hall.

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PIETERMARITZBURGSCH BOEREN VEREENIGING.—President: D. P. Boshoff; Secretary: E. G. Jansen, 313, Loop Street, Maritzburg.

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UTRECHT BOEREN VEREENIGING.—President: D. J. A. van der Spuy; Secretary: G. J. Shawe, Utrecht.

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C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger)

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WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C. J. Offord, G. W. Linfoot, T. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

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ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Purchase of Tree Seeds.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Forester, Cedara.

E. R. SAWER,
Director, Experiment Stations.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

E. R. SAWER,
Acting Conservator of Forests.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	...	1½d. each.
Pigs...	...	...	3d. "
Chilling and Freezing Beef,	1st week	...	1s. 3d. per qr.
"	2nd	...	1s. "
"	Remaining weeks	...	9d. "
Sheep	...	...	per week ... 3d.
Pigs	...	...	6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	...	4s. each (including abattoir fee).
Sheep	...	...	6d. "
Pigs	...	...	1s. " up to 200 lbs.
"	...	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	...	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

Cows Wanted.

WANTED urgently, cows just calved or due to calve. Old animals suitable; any breed.

Apply—P.O. Box 282,
Pietermaritzburg.

Seeds for Distribution.

SEEDS of the following have been secured for distribution to farmers at cost price :—Cotton, Sugar Beet, Tobacco, Rice, Lupins and Field Peas, Italian and Perennial Rye Grass, Paspalum and Cocksfoot. Varieties and prices upon application to the Farm Manager, C.X.F., Cedara.

E. R. SAWER,
Director, Experiment Stations.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K; Umvoti Location, 2 F.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breeds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

109a.—Scotchman, 39 years of age, producing good references from his previous employers, desires to obtain on a farm light work, such as bookkeeping, superintending despatch of produce, &c.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Indian Agricultural Research Institute (Pusa)
LIBRARY, NEW DELHI-110012

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